Vol. 892 Number 1

OFFICIAL GAZETTE

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UNITED STATES PATENT OFFICE

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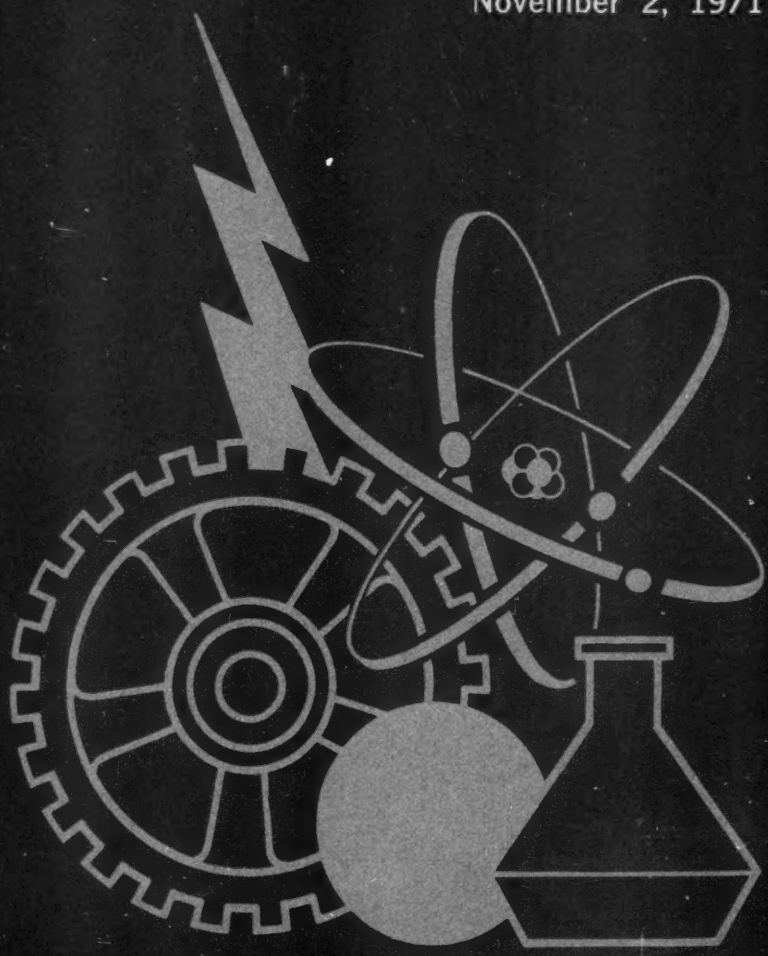
PATENTS

November 2, 1971



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OFFICIAL GAZETTE of the UNITED STATES PATENT OFFICE

November 2, 1971 Volume 892 Number 1

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PATENT OFFICE NOTICES

PATENTS AND TRADEMARKS

Relief in Cases Affected by the Postal Emergency of March 1970

On June 30, 1971, President Nixon signed into law Public Law 92–34.

Public Law 92–34 requires claims for the benefit of an earlier filing date (Section 1.) and requests for such other relief as may be appropriate (Sec. 2.) to be filed in the Patent Office within 6 months after enactment, that is by December 30, 1971. Failure to file a statement within the noted period will result in loss of right to take advantage of the benefits of the law. Further explanation or evidence may be required at a subsequent time. Public Law 92–34 provides relief only for situations caused by the postal emergency which began on March 18, 1970, and ended on or about March 30, 1970, and for which there is no remedy under existing law.

The following explanation is designed to serve as a guide for persons desiring relief under the law.

The verified statement required to be filed under sections 1 and 2 of the law may be by any of the following:

(a) Applicant(s) for patent or trademark registration;
(b) Patentee(s) or trademark registrant;
(c) Owner(s) of record.

In cases involving plural inventors, statements made under (a) or (b) must be signed by all inventors.

The verified statement must specify the particular earlier date of receipt in the Patent Office to which the applicant, patentee or trademark registrant, or owner of record believes his application, fee or other paper would be entitled except for the delay caused by the postal emergency of March, 1970. The statement must be verified, that is, in the form of an oath or declaration. (37 CFR 1.68 (Patent Rule 68) and 2.20 (Trademark Rule 2.20).)

Evidence will not normally be required or considered by the Patent Office regarding a claimed filing date of March 18, 1970, or later, in applications actually filed before June 1, 1970. Claims for earlier filing dates in cases actually filed after June 1, 1970, or claiming a date prior to March 18, 1970, will be considered prima facie unreasonable unless an acceptable explanation of the basis for the claim is filed in the Patent Office with the claim or within 1 month or such longer time as may be prescribed by the Commissioner. Any claim not accepted by the Patent Office because it is obviously defective on its face or unreasonable may be subjected to further review by petition to the Commissioner.

The statement should adequately identify the involved application, patent, or trademark registration by including the name of the applicant, patentee or registrant, title of the invention or an identification of the mark, serial number, filing date, group art unit number and any other identifying data such as status of the case (e.g., awaiting first action, amendment, brief, etc.). Acceptable statements will be acknowledged, made of record and retained in the Patent Office files.

When practical, earlier filing dates accorded under this law, as well as the originally granted filing dates, will be identified on ensuing patents and trademark registrations. These dates will also be included in the OFFICIAL GAZETTE in connection with patents, trademark registrations and trademarks published for opposition. In other cases, such as applications in issue prior to filing of a claim, the patent or trademark registration number and claimed filing dates will be published in the OFFICIAL GAZETTE after December 30, 1971.

Patents issued with earlier filing dates afforded by this law will not be effective as prior art as of such earlier filing dates under subsection 102(e) of title 35 of the United States Code.

In a pending patent application in which a claim for an earlier filing date has been acknowledged under this law, applicants need not file a Rule 131 affidavit to overcome a reference having an effective filing date between the "earlier" and the actual filing date of the application. Intervening references of this type will be cited but not applied by the examiner. Although a statement claiming an earlier date is accepted by the Patent Office, the claimed earlier date may be called into question in subsequent inter partes proceeding in the Patent Office or in the courts. In these proceedings, the applicant or owner may be required to present further evidence establishing the filing date to which the application is entitled. In such cases a definite determination shall be made as to whether the applicant is entitled to the earlier date under the law.

In cases where a patent application or an application for registration or late renewal of a trademark is determined to have become abandoned for failure to meet a statutory time limit because of the postal emergency, the application will automatically be restored to pending status by the acceptance of the request, and prosecution or other processing of the application will be resumed. Similarly, if a trademark registration is determined to have been cancelled for failure to meet the statuory time limit within which to file the affidavit required under section 8 of the Trademark Act (15 U.S.C. 1058a) because of the said emergency, the order for cancellation will be rescinded.

As explained in the notice of January 26, 1971 (882 O.G. 1342), applicants who may be entitled to earlier filing dates should note that a change in their U.S. filing date might, in turn, alter the date of expiration of the 6- and 12-month periods for filing applications abroad under provisions of the Paris Convention for the Protection of Industrial Property.

WILLIAM E. SCHUYLER, JR.,
Commissioner of Patents.

Dated: July 14, 1971.

JAMES H. WAKELIN, JR.,
Assistant Secretary for Science and Technology.

[FR Doc. 71–10469; Filed 7–22–71; 8:52 am]

36 F.R. 13694; July 23, 1971

Trademark Rules

[37 CFR Part 2]

Notice of Proposed Rule Making

Notice is hereby given that pursuant to the authority contained in sec. 41 of the Act of July 5, 1946 (60 Stat. 440; 15 U.S.C. 1123) and sec. 6 of the Act of July 19, 1952 (66 Stat. 793; 35 U.S.C. 6), the Patent Office proposes to amend Title 37, Code of Federal Regulations by revising §§ 2.54, 2.67, 2.87, 2.88 and 2.187.

All persons are invited to present their written views, objections, recommendations, or suggestions in connection with the proposed changes to the Commissioner of Patents, Washington, D.C. 20231 on or before December 3, 1971. No oral hearing will be held. Any written comments or suggestions may be inspected by any person upon written request a reasonable time after the closing date for submitting comments.

The proposed revision of § 2.54 would permit the Patent Office to accept substitute drawings in appropriate situations other than those specified in present § 2.54, by deleting the last sentence of present § 2.54.

The proposed revision of § 2.67 is intended to clarify the situations in which an examiner can suspend action on an application.

The proposed revision of § 2.87 and § 2.88 is intended to make clear that both goods and services may be the subject of a single application or certificate of registration in accordance with sec. 30 of the Trademark Act of 1946. Also, a requirement of submitting five specimens for each class would be added to § 2.87.

The proposed revision of § 2.187 would establish a procedure by which the Patent Office could insure that the certificate of registration would issue to the owner of the mark.

The proposed changes are as follows:

1. Revise § 2.54 to read as follows:

§ 2.54 *Informal drawings.*

A drawing not in conformity with §§ 2.51 to 2.53 may be accepted for purpose of examination, but the drawing must be corrected or a new one furnished, as required, before the mark can be published or the application allowed. The necessary corrections will be made by the Patent Office upon applicant's request and at his expense.

2. Revise § 2.67 to read as follows:

§ 2.67 *Suspension of action by the Patent Office.*

Action by the Patent Office may be suspended for a reasonable time for good and sufficient cause. A proceeding pending before the Patent Office or a court which is relevant to the issue of registrability of the applicant's mark, or an application which is the basis for registration under section 44(d) of the Trademark Act pending before a foreign trademark office, will be considered prima facie good and sufficient cause. An applicant's request for a suspension of action must be filed within the response period and may be considered a response. See § 2.62. The first suspension is within the discretion of the Examiner of Trademarks and any subsequent suspension must be approved by the Commissioner.

3. Revise § 2.87 to read as follows:

§ 2.87 *Combined applications.*

An application also may be filed to register the same mark for any or all of the goods and/or services upon or in connection with which the mark is actually used and which fall within a plurality of classes. However, dates of use for each class, five specimens for each class, and a fee equaling the sum of the fees for filing an application in each class are required. A single certificate of registration for the mark may be issued.

4. Revise § 2.88 to read as follows:

§ 2.88 *Applications may be combined.*

(a) When several applications have been filed by the same applicant for registration on the same register of a mark shown in identical form on the drawings for goods and/or services in different classes and each of the applications has been allowed, a single certificate based on such applications may be issued. A request for the issuance of a consolidated certificate must be made of record in each of the applications involved prior to the allowance of any of the applications.

(b) The issuance of any original certificate may be suspended upon request of the applicant, for a period not exceeding 6 months, to permit such consolidation.

5. Revise § 2.187 to read as follows:

§ 2.187 *Certificate of registration may issue to assignee.*

The certificate of registration may be issued to the assignee of the applicant provided the assignment is recorded in the Patent Office at least 10 days before the application is allowed, and written notice of the recording of the assignment and the address of the assignee is made of record in the application file by the applicant or assignee.

Dated: September 24, 1971.

ROBERT GOTTSCHALK,
Acting Commissioner of Patents.

Approved:

JAMES H. WAKELIN, Jr.,
Assistant Secretary for Science and Technology.

[FR Doc. 71-14511; Filed 10-1-71; 8:50 am]

Published in 36 F.R. 19315, Oct. 2, 1971

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,704,209, Halahan, Lyon and Aronson, PAPER FEEDING MECHANISM; **2,770,458,** same, PAPER FEEDER, **filed** June 9, 1971, D.C., S.D.N.Y., Doc. 71-C-2585, *Halm Instrument Co. v. Brandtjen & Kluge, Inc.*

2,770,458. (See 2,704,209.)

3,179,026, A. F. Crone, SEALING ELEMENT FOR PAVEMENT GROOVES; **3,276,336,** same, SEALING DEVICES FOR GROOVES BETWEEN STRUCTURAL BLOCKS; **3,482,292,** A. Frohlich, ENDSTOP MEMBERS FOR SLIDE FASTENERS, **filed** Mar. 26, 1971, D.C., W.D.N.Y. (Buffalo), Doc. C-1971-136, *Acme Highway Products Corp. v. Watson-Bowman Associates, Inc., Stewart C. Watson and Thomas C. Bowman.*

3,276,336. (See 3,179,026.)

3,482,292. (See 3,179,026.)

3,487,221, L. M. Frank, LIGHT ACTIVATED TRIGGER FOR PHOTOGRAPHIC FLASH SYSTEM, **filed** Apr. 28, 1971, D.C., N.D. Ill. (Chicago), Doc. 71c1010, *The Lase Co. v. Introl Corp.*

3,526,326, J. A. Castaldi, STORAGE RETRIEVAL APPARATUS WITH POSITIONAL CONTROL MEANS, **filed** June 4, 1971, D.C., E.D.N.Y. (Brooklyn), Doc. 71-C-680, *Supreme Equipment & Systems Corp. v. Atomic Development Corp. et al.*

3,528,542, J. H. Miller, Battery Containers, **filed** Apr. 23, 1971, D.C., W.D. Wis. (Madison), Doc. 71-C-123, *Gold Inc. v. Globe-Union Inc. and Sears, Roebuck and Co.*

3,528,560, R. C. Price, SAMPLE DISPLAY FIXTURE, **filed** June 10, 1971, D.C. Colo. (Denver), Doc. C-3189, *Raymond C. Price and Control Sciences, Inc. v. Lake Sales Supply R.M., Inc.*

3,538,389, Levesque and Harper, SUB-ELEMENT FOR ELECTRONIC CIRCUIT BOARD, **filed** May 4, 1971, D.C., C.D. Calif. (Los Angeles), Doc. 71-1086-CC, *Circuit-Stik, Inc. (California corporation) v. International Rectifier Corp. (California corporation).*

3,540,612, W. T. Brady, BOTTLE CAP AND BOTTLE COMBINATION, **filed** May 18, 1971, D.C., N.D. Ill. (Chicago), Doc. 71c1209, *Bio Dynamics, Inc. v. Serosonic Laboratories and Oms Surgical Supply.*

3,553,762, Padgett and Padgett, CONTAINER, **filed** Apr. 6, 1971, D.C., E.D. Va. (Alexandria), Doc. C/A 123-71-A, *Raymond D. Padgett, Jr. and George R. Padgett v. Metropolitan Paint Stores, Inc.*

3,556,391, D. W. Kosterka, PHONOGRAPH RECORD ALBUM PACKAGE, **filed** Apr. 5, 1971, D.C., S.D.N.Y., Doc. 71-C-1521, *Album Graphics, Inc. v. Buddah Records, Inc.*

3,561,146, R. H. Dembar, PHOTOGRAPH DISPLAY APPARATUS, **filed** May 6, 1971, D.C., E.D. Mich. (Detroit), Doc. 36460, *Graphicana Corp. v. Baia Corp.*

3,567,080, M. S. Johnston, TAPPING DEVICE FOR BEER KEGS AND THE LIKE, **filed** Apr. 12, 1971, D.C., E.D. Wis. (Milwaukee), Doc. 71-C-150, *Draft Systems, Inc. v. The Perlick Company, Inc.*

3,572,245, B. W. Grayson, APPARATUS AND METHOD OF CONDUCTING STRING SHOT OPERATIONS, **filed** May 5, 1971, D.C., E.D. Calif. (Fresno), Doc. F-525-C, *Bobby W. Grayson v. Ward W. Fisher, Velma L. Fisher, Fisher Oil Well Service.*

3,581,067, Willits and Mohan, PITCH MATCHING DETECTING AND COUNTING SYSTEM, **filed** June 1, 1971, D.C., N.D. Ill. (Chicago), Doc. 71c1335, *Spartanics Ltd. v. Dyntics Engineering Corp.*

Re. 25,613, C. L. Truesdale, DRAPERY HEADING SEAM, **filed** May 6, 1971, D.C., E.D. Va. (Richmond), Doc. 307-71-R, *Plastic Products Inc. v. Colonial Plastics, Inc.*

D. 203,491, G. H. Jones, WALL-MOUNTED SPHYGMOMANOMETER, **filed** May 20, 1971, D.C., E.D.N.Y. (Brooklyn), Doc. 71-C-608, *Propper Manufacturing Co., Inc. v. W. A. Baum Co., Inc.*

D. 215,707, G. L. Baldwin, DRIVE-IN RESTAURANT, **filed** May 25, 1971, D.C. Ariz. (Phoenix), Doc. C-71-291 PHX, *Snak-Bar International, Inc. v. Systems Bldg. Industries, Inc. et al.*

D. 217,082, H. Koenig, PANTS, **filed** Oct. 9, 1970, D.C., S.D. Fla. (Miami), Doc. 70-1485-C-LK, *Harold Koenig v. Proper Industries, Inc., doing business as Terry Sue Casuals.* Upon stipulation of the parties, it is ordered and adjudged: that U.S. Letters Patent No. 217,082 were legally issued to plaintiff, and plaintiff still is the owner of patent; that a perpetual injunction be issued enjoining defendant; and the counterclaim of defendant be dismissed with prejudice, June 9, 1971.

D. 219,776, E. C. Jacobs, DISPENSER FOR TOILET TANKS, **filed** May 26, 1971, D.C., N.D. Calif. (San Francisco), Doc. C-71-1019, *Robert F. Castronovo et al. v. Edward Carl Jacobs.*

Certificates of Correction for the Week of Nov. 2, 1971

Re. 27,093	3,557,329	3,575,890	3,585,179
Re. 27,132	3,557,630	3,576,815	3,585,362
D. 213,586	3,558,515	3,576,874	3,585,957
D. 220,212	3,558,551	3,576,900	3,586,138
D. 221,278	3,559,449	3,577,032	3,586,318
3,350,348	3,561,950	3,577,358	3,586,347
3,383,234	3,563,878	3,577,992	3,586,447
3,396,009	3,563,883	3,578,190	3,586,543
3,447,956	3,564,306	3,578,217	3,586,629
3,491,291	3,565,088	3,578,728	3,586,655
3,499,783	3,565,423	3,578,765	3,586,855
3,501,096	3,565,888	3,578,769	3,586,890
3,504,008	3,566,816	3,578,990	3,586,999
3,512,675	3,567,725	3,579,269	3,587,002
3,523,932	3,568,159	3,579,510	3,587,737
3,528,862	3,568,240	3,580,272	3,588,062
3,534,524	3,568,265	3,580,649	3,588,563
3,535,138	3,570,747	3,580,697	3,588,582
3,542,274	3,571,543	3,580,953	3,588,589
3,543,009	3,571,665	3,581,555	3,588,864
3,547,353	3,571,786	3,581,782	3,589,550
3,549,309	3,572,116	3,582,661	3,589,552
3,551,519	3,572,630	3,582,853	3,589,653
3,551,992	3,573,066	3,583,141	3,589,762
3,552,252	3,573,299	3,583,441	3,589,871
3,552,624	3,573,322	3,583,468	3,591,247
3,553,069	3,573,421	3,583,996	3,591,531
3,555,541	3,573,618	3,584,042	3,591,559
3,556,148	3,574,031	3,584,215	3,591,570
3,556,226	3,574,512	3,584,291	3,591,596
3,557,002	3,575,237	3,584,584	3,591,814
3,557,252	3,575,758	3,585,024	

Dedication

3,519,570.—*Charles Bruce McCarty,* Cincinnati, Ohio. ENZYME-CONTAINING DETERGENT COMPOSITIONS AND A PROCESS FOR CONGLUTINATION OF ENZYMES AND DETERGENT COMPOSITIONS. Patent Dated July 7, 1970. Dedication filed June 17, 1971, by the assignee, *The Procter & Gamble Company.*

Hereby dedicates to the Public the entire remaining term of said patent.

Disclaimers

3,534,344.—*George R. Santana,* Saratoga, Calif. METHOD AND APPARATUS FOR RECORDING AND DETECTING INFORMATION. Patent dated Oct. 13, 1970. Disclaimer filed Aug. 9, 1971, by the assignee, *International Business Machines Corporation.*

Hereby enters this disclaimer to claims 1, 2, 3, 4, 6, 7, 8, 10, 11 and 12 of said patent.

3,544,013.—*Daniel Dorfman,* Woodbury, N.Y. SOIL TREATING APPARATUS. Patent dated Dec. 1, 1970. Disclaimer filed Aug. 6, 1971, by the assignee, *Lawn-A-Mat Chemical & Equipment Corporation.*

Hereby enters this disclaimer to all of the claims of said patent.

3,592,745.—*Wilbur G. Hespenheide,* Westlake Village, Calif. PROCESS FOR MANUFACTURING A MAGNETIC MEMORY. Patent dated July 13, 1971. Disclaimer filed Aug. 9, 1971, by the assignee, *Burroughs Corporation.*

Hereby disclaims all that portion of the term of said patent which extends beyond July 6, 1982.

3,592,746.—*Wilbur G. Hespenheide,* Webster, N.Y. ELECTROPLATING METHOD OF FABRICATING PLATED WIRE MEMORY UNITS. Patent dated July 13, 1971. Disclaimer filed Aug. 9, 1971, by the assignee *Burroughs Corporation.*

Hereby disclaims all that portion of the term of said patent which extends beyond July 6, 1982.

PATENT EXAMINING CORPS

R. A. WAHL, Assistant Commissioner
F. H. BRONAUGH, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF OCTOBER 19, 1971

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—M. STERMAN, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	6-08-70
GENERAL ORGANIC CHEMISTRY, GROUP 120—I. MARCUS, Director. Heterocyclic; Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	4-24-70
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—L. J. BERCOVITZ, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	8-24-70
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—A. P. KENT, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	2-19-70
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—W. B. KNIGHT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	5-04-70
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS AND RELATED ELEMENTS, GROUP 210—N. ANSHER, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Miscellaneous.	2-16-71
SECURITY, GROUP 220—R. L. CAMPBELL, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	4-24-70
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	10-02-70
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—W. L. CARLSON, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	10-06-70
PHYSICS, GROUP 280—R. L. EVANS, Director. Photography; Sound and Lighting; Indicators and Optics; Measuring and Testing; Geometrical Instruments.	8-25-70
DESIGNS, GROUP 290—R. L. CAMPBELL, Director. Industrial Arts; Household, Personal and Fine Arts.	10-06-70
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—A. BERLIN, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Railways and Railway Equipment; Brakes; Rigid Flexible and Special Receptacles and Packages.	7-28-70
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—D. J. STOCKING, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus; Machine Tools for Shaping or Dividing; Work and Tool Holders Woodworking; Tools; Cutlery; Jacks.	7-01-70
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—A. RUEGG, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	7-30-70
HEAT, POWER AND FLUID ENGINEERING, GROUP 340—C. F. GAREAU, Director. Power Plants; Combustion Engines; Fluid Motors; Pumps; Turbines; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Vaporizing; Temperature and Humidity Regulation; Machine Elements; Power Transmission; Fluid Handling; Lubrication; Joint Packing.	11-02-70
CONSTRUCTIONS, SUPPORTS, TEXTILES, CLEANING, GROUP 350—T. J. HICKEY, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Receptacles; Supports; Cabinet Structures; Centrifugal Separations; Cleaning; Coating; Pressing; Agitating; Foods; Textiles; Apparel and Shoes; Sewing Machines; Winding and Reeling.	8-10-70

Expiration of patents: The patents within the range of numbers indicated below expire during November 1971, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

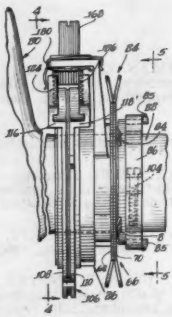
Patents..... **Numbers 2,692,987 to 2,695,997, inclusive**
Plant Patents..... **Numbers 1,312 to 1,327, inclusive**

REISSUES

NOVEMBER 2, 1971

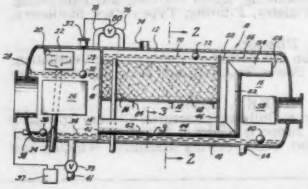
Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

27,209
BLUE LATERAL AND PURITY MAGNET ASSEMBLY
Robert R. Melone, Des Plaines, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.
Original No. 3,332,046, dated July 18, 1967, Ser. No. 457,084, May 19, 1965. Application for reissue Nov. 10, 1969, Ser. No. 875,488
Int. Cl. H01f *1/00*
U.S. Cl. 335—212 **16 Claims**



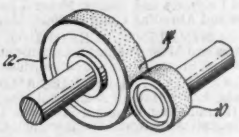
A magnetic correction device for use with cathode ray tubes wherein a pair of axially contiguous magnetic rings having magnetic pole means thereon are arranged to move in a limited arcuate path relative to one another by a common operator. The device may further include a second pair of magnetic rings which are axially spaced from the first pair of magnetic rings and are mounted relative to a supporting base by a resilient locking ring.

27,210
METHOD AND APPARATUS FOR THE TREATMENT OF LIQUIDS
Robert E. McMinn and Clifford C. Dougherty, Jr., Oklahoma City, Okla., assignors to Black, Sivalls & Bryson, Inc., Kansas City, Mo.
Original No. 3,396,512, dated Aug. 13, 1968, Ser. No. 581,367, Sept. 22, 1966. Application for reissue Jan. 12, 1970, Ser. No. 2,072
Int. Cl. B01d *53/14*
U.S. Cl. 55—170 **7 Claims**



The present invention is directed to a method and apparatus for the treatment of liquids, and more particularly, to method and apparatus used in the separation of liquids of differing densities and of gases also contained therein. The present invention utilizes a vessel having compartments containing heating means, filtration means, and conveying means, all designed to continue the coalescence and separation. To this end, conveying ducts having a large cross-sectional area are used, which ducts terminate below maintained liquid levels.

27,211
FRICTION DRIVE FLUID
Fred G. Rounds, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.
Original No. 3,394,603, dated July 30, 1968, Ser. No. 567,494, July 25, 1966. Application for reissue Oct. 15, 1969, Ser. No. 871,490
Int. Cl. F16h *15/08*
U.S. Cl. 74—200 **4 Claims**



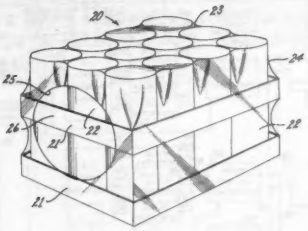
A friction drive transmission such as a toric transmission having two axially aligned opposing power transmitting race members and at least one roller member disposed between the races in tractive rolling contact therewith, and a fluid film between the races and the roller at the points of contact, which fluid is the hydrogenated polymeric hydrocarbon reaction product of at least one of the olefinic hydrocarbon monomers taken from the group consisting of propene, butene and pentene, the polymer having a molecular weight of 300 to 500.

27,212
PLASTIC FILM ENCASED PACKAGE CONSTRUCTIONS
Marion L. Brown, Richmond, Va., assignor to Reynolds Metals Company, Richmond, Va.
Original No. 3,331,503, dated July 18, 1967, Ser. No. 573,749, Aug. 2, 1966, which is a continuation of Ser. No. 366,424, May 11, 1964. Application for reissue Mar. 3, 1970, Ser. No. 16,271
Int. Cl. B65d *65/16, 71/00, 85/62*
U.S. Cl. 206—65 S **14 Claims**

[This disclosure relates to a package construction means having an open ended receptacle means filled with product means, such as product container means or the like, disposed in a heat shrunk film-like tubular member whereby such heat shrunk film-like tubular member tightly compacts the product means and receptacle means together so that the resulting package construction means can be readily shipped and stored without requiring a conventional outer surrounding corrugated cardboard container, the receptacle means at the bottom of such package construction means providing support at the bottom four corners of the heat shrunk tubular film-like member

and fully protecting the product means from impact at such four corners.]

Package constructions having open ended receptacle means filled with product containers arranged in rows and disposed in a heat shrunk film-like member holding the receptacle means and product containers tightly together. A plurality of open-ended receptacle means, each filled with rows of containers, can be disposed in stacked relation within the heat shrunk tubular film-like member. These package constructions can be readily shipped and



stored without requiring a conventional outer surrounding corrugated cardboard container, the receptacle means at the bottom of the package constructions providing support at the bottom four corners of the heat shrunk tubular film-like member and fully protecting the product containers from impact at the four corners.

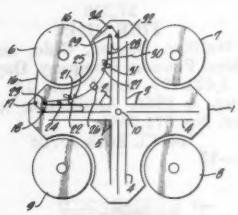
27,213
MULTIPLE STATION TAPE HANDLING APPARATUS

Harry F. Rayfield, Bradbury, and Magne Jarle Kjos, Agoura, Calif., assignors to Burroughs Corporation, Detroit, Mich.

Original No. 3,443,766, dated May 13, 1969, Ser. No. 610,257, Jan. 19, 1967. Application for reissue Feb. 26, 1970, Ser. No. 14,688

Int. Cl. G03b *1/04;* **G11b** *15/32*

U.S. Cl. 242—180 **33 Claims**



Improvements in multiple station tape handling apparatus, particularly of the type involving coaxially arranged reels. A criterion is involved for locating and orienting cylindrical tape guiding elements on a work surface so as to guide tape from reels canted at an angle with respect to the work surface without exerting axial forces on the tape. In addition, a supporting structure is shock-mounted to a fixed frame and comprises a rigid, tubular hub from which rigid beams extend radially. Reel drive assemblies are mounted on the beams and a deck plate, along which the tape is transported, is mounted on the end of the hub. The drive assembly comprises coaxially arranged shafts that are supported by a novel bearing arrangement.

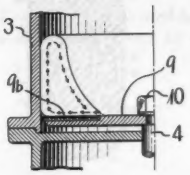
27,214
METHOD AND APPARATUS FOR MAKING SPHERICAL GRANULES

Nobuo Nakahara, Matsubara, Japan, assignor to Fuji Denki Kogyo Kabushiki Kaisha, Gamaucho, Jotoku, Osaka, Japan

Original No. 3,277,520, dated Oct. 11, 1966, Ser. No. 375,904, June 17, 1964. Application for reissue May 31, 1968, Ser. No. 741,834

Int. Cl. B29c *23/00*

U.S. Cl. 264—15 **8 Claims**



A method of and apparatus for making spherical granules from extrusions of a wet mixture of powdered solid material by introducing such extrusions onto a rotating circular plate having an uneven surface. Such uneven surface propels the extrusions outwardly by centrifugal force against a stationary wall, the extrusions then falling back toward the center of the rotating plate. Such repetitive action is effective to divide the extrusions into short lengths and transform such lengths into substantially uniform spherical granules.

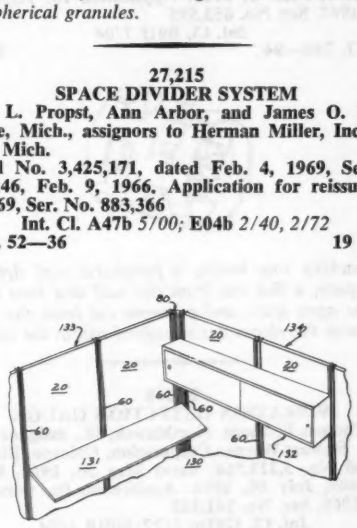
27,215
SPACE DIVIDER SYSTEM

Robert L. Propst, Ann Arbor, and James O. Kelley, Saline, Mich., assignors to Herman Miller, Inc., Zeeland, Mich.

Original No. 3,425,171, dated Feb. 4, 1969, Ser. No. 526,146, Feb. 9, 1966, Application for reissue Dec. 8, 1969, Ser. No. 883,366

Int. Cl. A47b *5/00;* **E04b** *2/40, 2/72*

U.S. Cl. 52—36 **19 Claims**



A combination locking joint and accessory hanging structure for utilization in a free-standing space divider system wherein adjacent panels are affixed together by means of an elongated spline having a plurality of pear-shaped apertures therein. A plurality of wedging members extend from the facing edges of the panels, and these wedging members are received by the apertures in the spline. A bearing member is provided across the top of the panels and the spline is shifted upwardly with respect thereto by means of a threaded rod affixed to the spline and bearing against the bearing member. The joint is provided with converging flanges at either side thereof which, in conjunction with the spline, form an accessory anchoring channel adapted to receive wall-hung accessory supporting clips. It is understood that this abstract is not to be utilized to limit the scope of this disclosure.

27,216
EXPANDABLE LINK

Herbert George Empson, 2027 Lynwood Terrace, San Jose, Calif. 95128

Original No. 3,298,173, dated Jan. 17, 1967, Ser. No. 388,896, Aug. 11, 1964, which is a continuation of abandoned Ser. No. 802,283, Jan. 13, 1969. Application for reissue Mar. 26, 1970, Ser. No. 20,476
Int. Cl. F16g *13/24*
U.S. Cl. 59—78 5 Claims

A shock absorbing link for use in tie-down means for cargo in transit, wherein an endless chain is embedded in a resilient body member of elongated configuration.

27,217
[PALL] PACKING RING

John S. Eckert, Silver Lake, Ohio, assignor to The United States Stoneware Company, Tallmadge, Ohio

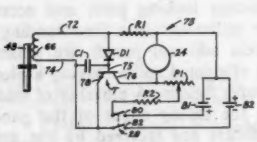
Original No. 3,266,787, dated Aug. 16, 1966, Ser. No. 177,577, Mar. 5, 1962. Application for reissue June 28, 1967, Ser. No. 653,595
Int. Cl. B01f *3/04*
U.S. Cl. 261—94 5 Claims

A packing ring having a peripheral wall defining an open space, a flap cut from the wall and bent inwardly into the open space and a tongue cut from the flap and bent away therefrom but contained within the wall.

27,218
VIBRATION DETECTION GAUGE

Thomas E. Bjorn, Northbrook, Ill., assignor to Stewart-Warner Corporation, Chicago, Ill.

Original No. 3,321,960, dated May 30, 1967, Ser. No. 381,665, July 10, 1964. Application for reissue May 23, 1968, Ser. No. 741,829
Int. Cl. G01m *1/22*; G01h *1/04*
U.S. Cl. 73—71.4 9 Claims

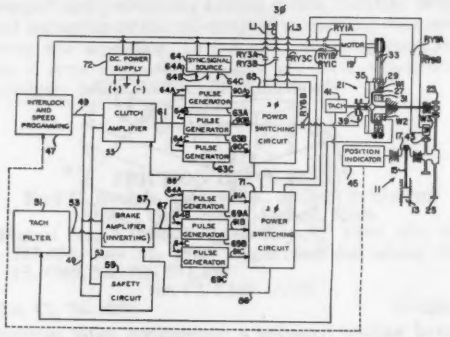


The disclosure of this application relates to apparatus for detecting wheel unbalance and includes a vibratory element for responding to vibrations induced by the wheel unbalance. A magnet carried by the element controls a transistorized circuit for indicating the degree of unbalance. A pneumatic damping device is provided for preventing excessive amplitudes in the movement of the vibratory element and magnet.

27,219
METHOD OF OPERATING A PRESS OVER A 4 TO 1 RANGE OF STROKING RATES

Theodore R. La Vallee, Ferndale, Mich., assignor to Eaton Yale & Towne, Inc., Cleveland, Ohio

Original No. 3,450,912, dated June 17, 1969, Ser. No. 654,166, July 18, 1967. Application for reissue July 13, 1970, Ser. No. 54,672
Int. Cl. H02k *49/04*
U.S. Cl. 310—95 6 Claims

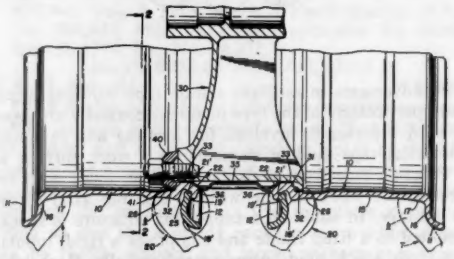


A method for operating a press over a wide range of speeds or stroking rates from a flywheel which is rotated at substantially constant speed so that substantially constant energy is available per press stroke. The press is coupled to the flywheel through a coupling which includes an eddy current clutch and an eddy current brake and the clutch and the brake are energized under tachometer feedback control to maintain the press speed at a preselected level. In the apparatus disclosed for practicing the method, the voltages applied to the clutch and brake are varied as inverse functions of the respective current level thereby to force or speed the response of the coupling. Further, safety circuit means are provided for deenergizing the coupling and for applying a mechanical brake if the actual speed of the press deviates from the desired speed by more than a preselected amount for more than a predetermined time.

27,220
TIRE RIMS

William D. Walther, Dayton, Ohio, assignor to The Dayton Steel Foundry Company, Dayton, Ohio

Original No. 3,421,797, dated Jan. 14, 1969, Ser. No. 570,269, Aug. 4, 1966. Application for reissue Nov. 19, 1969, Ser. No. 871,506
Int. Cl. B60b *25/06*
U.S. Cl. 301—12 1 Claim



A rim for mounting a tire. The rim has a fixed and a removable side flange. The base of the removable side flange is received in a cove on the rim edge and mechanically seats the tire bead. The tire bead is pneumatically sealed against a tapered surface adjacent the cove.

27,221

METHOD FOR HEAT TREATING RAILS

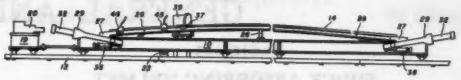
Fernand J. Dewez, Jr., Monroeville, and Joseph M. Wandrisco, Lower Burrell, Pa., assignors to United States Steel Corporation

Original No. 3,124,492, dated Mar. 10, 1964, Ser. No. 230,119, Oct. 12, 1962. Application for reissue Aug. 6, 1969, Ser. No. 853,565

Int. Cl. C21d 1/06, 9/04

U.S. Cl. 148—131 5 Claims

A method of heat treating a railroad rail so as not to distort its substantially straight condition whereby the rail is first elastically bent in the plane of the web and so maintained so that the head thereof is convex. The head portion is then heated progressively along its length sufficient to austenitize the head portion. This is followed by a progressive mild quench sufficient to transform the austenite to pearlite, and then self tempering by absorption of internal heat for a predetermined length of time.



Thereafter the head is quenched to ambient temperatures whereupon the rail is released from its elastically bent position.

PATENTS

GRANTED NOVEMBER 2, 1971

GENERAL AND MECHANICAL

3,616,463

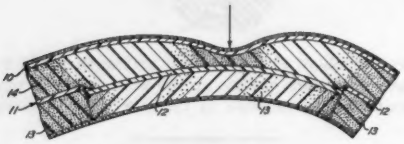
SHOCK ABSORBING HELMET

Michael Theodore, Pittsburgh, and James J. Summers, Bethel Park, Pa., assignors to Mine Safety Appliances Company, Pittsburgh, Pa.

Filed July 6, 1970, Ser. No. 52,212

Int. Cl. A42b *3/00*

U.S. Cl. 2—3 R 9 Claims



A helmet has spaced inner and outer shells of rigid material for covering the head, an outer layer of energy absorbing material between the two shells, an inner layer of energy absorbing material adjoining the inner surface of the inner shell. One of the shells and the energy absorbing layer adjoining its inner surface are subdivided into a plurality of adjoining segments, whereby an impact against the helmet will be distributed throughout the area of the shell segment and energy absorbing segment receiving the impact.

3,616,464

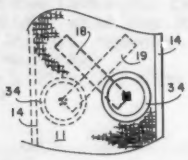
PROTECTIVE GARMENT FOR CHILDREN

Sylvia K. Whitten, 1020 Aberdeen Ave., Livermore, Calif. 94550

Filed Sept. 8, 1969, Ser. No. 855,854

Int. Cl. A41d *13/04*

U.S. Cl. 2—48 6 Claims



The present garment for protecting children's clothing is made of relatively heavy, waterproof fabric, covering the back as well as the front of the child, and can be opened and closed in front by means of Velcro® type fasteners. The heavy material and the positioning and nature of fastener employed make it possible for small children to put on and close subject garment without help from adults.

3,616,465

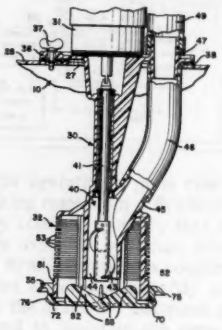
SEWAGE SYSTEM

Robert C. Helke, Dayton, Charles E. Van Gilder, Kettering, and Merlin S. Miller, Bradford, Ohio, assignors to Koehler-Dayton, Inc., Dayton, Ohio

Original application Dec. 9, 1968, Ser. No. 782,240, now Patent No. 3,545,011, dated Dec. 8, 1970. Divided and this application June 4, 1970, Ser. No. 43,445

Int. Cl. E03d *1/00*

U.S. Cl. 4—1 5 Claims



A self-contained, recirculating toilet includes a main holding tank having a drain opening in the bottom thereof and an access opening in the top of the tank in substantially vertically spaced relation to the drain opening. A unitary pump, filter, and drain valve assembly is inserted through the access opening with said drain valve sealing the drain opening when the assembly is locked in place. The drain valve seal forms part of the filter and includes an outwardly extending lip which engages the surface of the tank to form one seal, and a circumferentially extending ridge axially spaced from the ridge which engages the inside of the drain opening to form a second seal.

3,616,466

ADJUSTABLE SHOWER HEAD

Oliver Thurston Davis, Rte. 1, Dunlap, Tenn. 37237

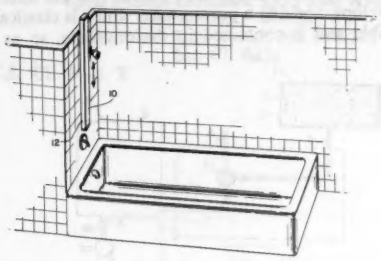
Filed Feb. 26, 1970, Ser. No. 14,371

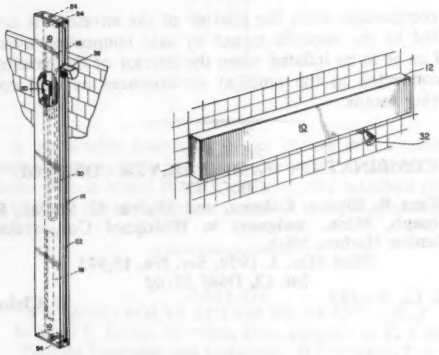
Int. Cl. A44k *3/22;* F24h *1/06*

U.S. Cl. 4—145 7 Claims

A shower head vertically adjustable as to height within a range for use by children and tall adults which includes an elongated casing having an elongated slot for the projecting shower head in its sidewall which faces the rear of the shower stall so that the casing as viewed from the front of the shower stall presents an unbroken attractive appearance; extendable and retractable tape means movable with the shower head to

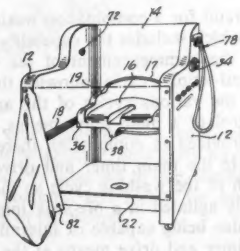
cover portions of the elongated slot which would otherwise be exposed; and friction clutch means within the





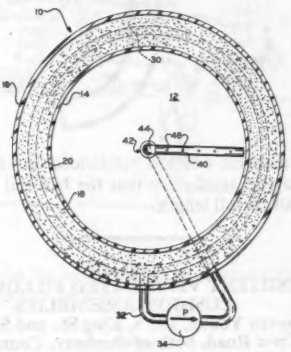
casing to hold the shower head in selected adjusted position.

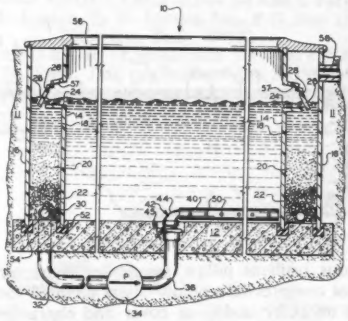
3,616,467
BATHING DEVICE
John I. Drain, 906 Mulberry St., Loudon, Tenn. 37774
Filed Jan. 30, 1970, Ser. No. 7,035
Int. Cl. A47k *3/08*
U.S. Cl. 4—146 **9 Claims**



A mobile bathing device for invalid use comprising a wheeled body with a supporting chair therein, with track means upon which said chair is carried and hydraulic means for moving said horizontally chair in a forward direction in said body and in a rearward direction in said body, with mixing valve means therein for regulating the temperature of water to be used by a person utilizing said device, with a water manifold disposed therein for supplying water to shoulder spray means, shampoo spray means, and seat spray means, said device having drain means in the bottom thereof for discharging water therefrom.

3,616,468
SWIMMING POOL INCLUDING INTEGRAL FILTER
John G. Takacs, Oakland Drive, Whitehouse Station, N.J. 08889
Filed Mar. 26, 1970, Ser. No. 22,865
Int. Cl. E04h *3/16, 3/18*
U.S. Cl. 4—172.15 **16 Claims**



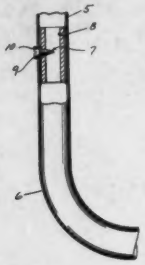


A swimming pool with flexible spaced inner and outer peripheral walls, the space between which is employed as a filter, thereby providing a filter of extremely large capacity. The filter material is preferably of the sand-gravel type, fluent solid material of this type serving to support and reinforce the flexible inner and outer walls. As an optional feature, the filtered water is returned to the main pool volume through a radial tube which is rotatable about a vertical axis at the pool center adjacent the pool bottom. The reaction force of the water discharging sideways from the tube causes the tube to continuously sweep around the pool bottom to prevent debris from collecting on the pool bottom.

3,616,469
COLLAPSIBLE BED RAIL
Stanley G. Injeski, Milwaukee, Wis., assignor to Worldsbest Industries, Inc., Sturgis, Mich.
Filed May 7, 1969, Ser. No. 822,485
Int. Cl. A47c *21/00, 19/12;* **A47f** *5/00*
U.S. Cl. 5—331 **2 Claims**

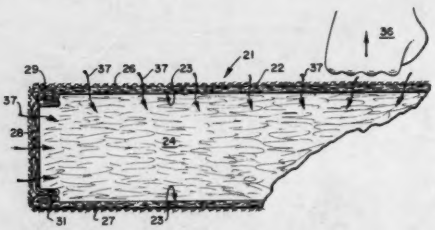
A collapsible bed rail for use with conventional mattresses and springs which has anchoring arms that extend under a mattress, to brace the rail in position, that are pivotally attached to the guard portion of the rail with a

connection that includes a slot and headed stop which both limits the degree of pivot and retains the parts in assembly. There is further shown a guard portion that extends



above a mattress which is subdivided into halves that are hinged to one another so that the bed rail can be folded to one-half its full length.

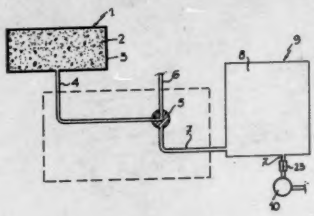
3,616,470
RESILIENT VENTILATED PILLOW AND CUSHION ASSEMBLIES
Robert Steven Young, 185 S. King St., and Samuel Young, 14 Crest Road, both of Danbury, Conn. 06810
Filed Dec. 8, 1969, Ser. No. 882,926
Int. Cl. A47g *9/00*
U.S. Cl. 5—337 **1 Claim**



Porous resilient pillow assemblies characterized by a resilient compressible pillow insert adapted for insertion within an outer casing or cover and characterized by a porous envelope of felted resilient fiber material formed of interlocked polymer fibers in a layer of substantial thickness, serving to enclose and contain a resilient, depressible body of porous filler and forming therewith a readily depressed resiilent body of pillow or cushion-shape combining resilient depressibility with springy resilient return capability enhanced by the highly porous nature of both the envelope and the enclosed filler material, allowing facile entrance and exit of the surrounding air through the envelope into the interior of the pillow or cushion.

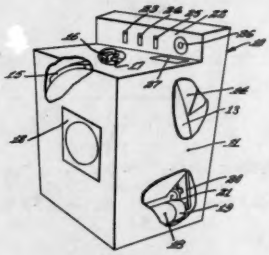
3,616,471
CUSHION
Francois Marie Joseph Braun, Kraainem, Belgium, assignor to Societe Anonyme belge d'Exploitation de la Navigation aerienne (SABENA), Brussels, Belgium
Filed Apr. 28, 1969, Ser. No. 819,867
Claims priority, application Belgium, May 7, 1968, 58,084
Int. Cl. A47c *27/08*
U.S. Cl. 5—348 **6 Claims**

A cushion for a seat, a couch or a mattress comprising in combination (1) a flexible, tight non-subdivided envelope, which is substantially compressible in the direction of the thickness of the cushion, (2) connecting means for selectively connecting the interior of said envelope with an ambient environment or with vacuum means in order to regulate the internal pressure in the envelope, (3) closing means for closing off the interior of said envelope in order to maintain a determined pressure in the interior of the envelope, and (4) a porous mass which is elastically compressible and is contained in the envelope, so as to



be compressed when the interior of the envelope is connected to the vacuum means by said connecting means and so as to be inflated when the interior of the envelope is connected to the ambient environment by said connecting means.

3,616,472
COMBINATION WASHER-DRYER CONTROL CIRCUIT
William B. Ripsco, Coloma, and Marvin G. Steffey, St. Joseph, Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.
Filed Mar. 3, 1970, Ser. No. 15,993
Int. Cl. D06f *33/02*
U.S. Cl. 8—159 **7 Claims**

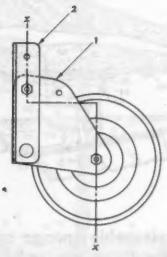


A control circuit for a combination washer-dryer laundry appliance which includes the capability of a pre-soak cycle prior to the commencement of the main washing cycle and an anti-wrinkle cycle following the normal drying operation, the various cycles of the appliance being under the control of a main timer means, with a pulser means being provided in conjunction therewith to intermittently actuate the main timer and drive means prior to the initiation of the washing cycle so that articles can be intermittently agitated in a pre-soak interval, with the pulser means also being capable of intermittently actuating the main timer and drive means at the conclusion of the normal drying cycle to provide the anti-wrinkle fluffing period.

3,616,473
DYEING-ASSISTANTS FOR SYNTHETIC FIBERS
James M. Leach, Greensboro, N.C., assignor to Chas. Pfizer & Co., Inc., New York, N.Y.
No Drawing. Filed Jan. 17, 1968, Ser. No. 698,391
Int. Cl. D06p *5/06*
U.S. Cl. 8—172 **3 Claims**

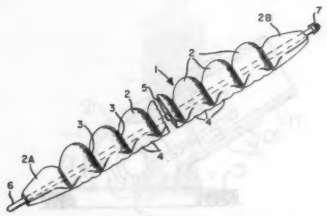
In the dyeing of synthetic fibers, the use of various bis-(acetoxy- and propionoxyalkyl)acetamides, and substituted and unsubstituted N,N-dialkylbenzamides and N,N,N',N'-tetraalkylphthalamides, as dyeing assistants.

3,616,474
RETRACTABLE BOAT LAUNCHING WHEEL
Cyril Martin Lindblad, 1533 East Ave., Napa, Calif. 94558
Filed Nov. 7, 1969, Ser. No. 870,217
Int. Cl. B63c
U.S. Cl. 9—1 T 1 Claim



A retractable launching wheel having two aluminum angle beams secured to the transom of the boat. Two plates with a wheel thereon are pivotally attached to the beams and movable from a retracted to an extended position.

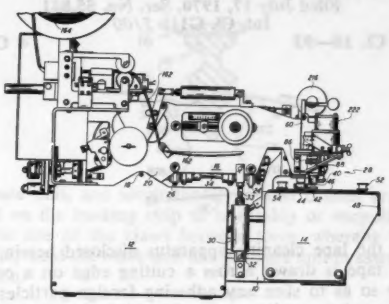
3,616,475
FOAMED POLYLACTAM BUOYANT BELT
Edward F. Lewis, Wycliffe, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.
Filed Aug. 14, 1969, Ser. No. 850,114
Int. Cl. B63c *9/10*
U.S. Cl. 9—340 7 Claims



A buoyant belt comprising a continuous elongated body of foamed polylactam, said body having a plurality of segments that are attached to one another by integral, flexible, hinge portions, and means for holding the belt around the body of the wearer.

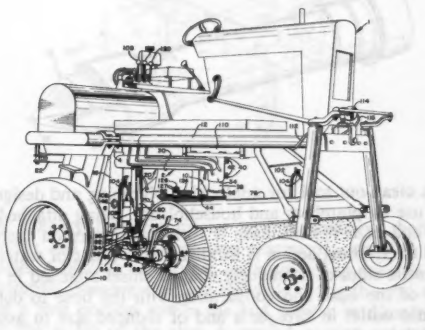
3,616,476
RIB APPLYING MACHINE WITH MOVABLE PLOUGH
Horst M. Leonhardt, Boston, Mass., assignor to Jacob S. Kamborian, Jr., Lincoln, Mass.
Filed July 31, 1970, Ser. No. 59,891
Int. Cl. A43d *43/06*
U.S. Cl. 12—20 13 Claims

A machine for applying a flange of a rib, having a fold extending away from the flange, along the periphery of an insole. The machine incorporates a plough that is engageable with the fold as the rib exits from a mechanism that applies the rib to the insole. The plough is movably mounted between a position wherein the plough can intersect and move the fold away from the flange and a



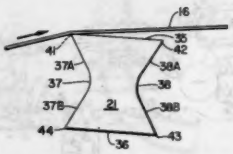
position wherein the plough is out of intersecting relationship with respect to the fold.

3,616,477
POWER DRIVEN ROAD SWEEPER WITH LATERALLY AND ANGULARLY ADJUSTABLE BRUSH
Walter F. Larson, % W. Larson, Inc., P.O. Box 1967, Plainview, Tex. 79072
Continuation-in-part of application Ser. No. 638,831, May 16, 1967. This application May 2, 1969, Ser. No. 827,466
Int. Cl. E01h *1/05*
U.S. Cl. 15—82 14 Claims



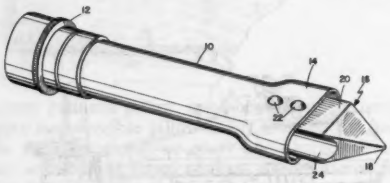
A power driven mobile sweeper, having a high frame and a relatively short wheel base, with a transversely movable support frame thereunder. A rotary brush mounting frame mounted on a vertical axis on the transversely movable support frame therebelow and below the mobile sweeper. The transversely movable support frame is movable transversely of the tractor by fluid actuated means, such as a fluid cylinder, and the brush mounting frame is movable arcuately, with respect to the transversely movable support frame, by fluid actuated means, such as a fluid cylinder. This enables the rotary brush mounting frame to be moved from side to side of the support frame and extend outwardly on either side of the mobile sweeper at different angles. The brush is driven by a prime mover, such as a fluid powered motor connected thereto in geared relation.

3,616,478
APPARATUS FOR CLEANING MAGNETIC RECORDING TAPE
William B. Martz, Manchester, and Leonard L. Curado, Marshfield Hills, Mass., assignors to Computer-Link Corporation, Burlington, Mass.
Filed July 17, 1970, Ser. No. 55,841
Int. Cl. G11b 5/00
U.S. Cl. 15—93 4 Claims



In the tape cleaning apparatus disclosed herein, magnetic tape is drawn across a cutting edge on a ceramic blade so as to slice any adhering foreign particles from the coated face of the tape. The blade is constructed in elongate form and has a generally hourglass-shaped cross-section providing four parallel cutting edges, each edge having an included angle of about sixty degrees. Further, the path of the tape is arranged so that it approaches the cutting edge at an angle which produced a cutting action rather than a scraping action.

3,616,479
PLUMBER'S NOZZLE
George K. De Hart, Imperial Beach, Calif., assignor to Floyd E. Minor, Pacific Beach, and Douglas A. McGrew, Chula Vista, Calif., fractional part interest to each
Filed July 24, 1970, Ser. No. 57,987
Int. Cl. B08b 9/02
U.S. Cl. 15—104.3 3 Claims



A clean-out tool for unblocking plumbing and designed for use by plumbers and householders. Being attached to the end of a flexible hose it forms an extension thereof and the flushing action is localized as two jets of water at opposite sides of a uniquely shaped chisel attached in the end of the hose and cooperating with the hose to define a fluid outlet in two parts and of reduced size to assure such jet action.

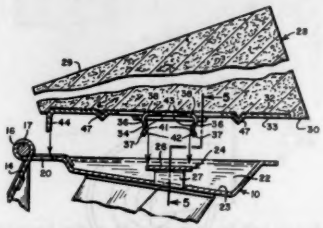
3,616,480
FLAGGED BRISTLE
John Feroce, Cincinnati, and Edward D. Zelinski, Urbana, Ohio, assignors to The Drackett Company, Cincinnati, Ohio
Filed Nov. 19, 1968, Ser. No. 777,069
Int. Cl. A46b 1/00
U.S. Cl. 15—159 A 5 Claims

The invention is concerned with new flaggable bristle formations useful in the manufacture of brooms. The formulations are comprised of a mixture of two or more incompatible thermoplastic resins from the following groups:

(1) Propylene copolymers, ethylene copolymers, polyallomer block copolymers, and mixtures of these.

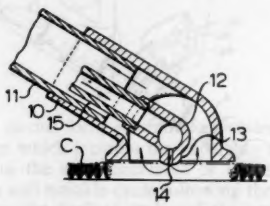
(2) Polystyrene, acrylonitrile-butadiene styrene terpolymers and mixtures of these.

3,616,481
REPLACEABLE SPONGE MOP HEAD
Cornelis van Spronsen, Berea, Ohio, assignor to Nylonge Corporation, Cuyahoga County, Ohio
Filed Feb. 18, 1970, Ser. No. 12,272
Int. Cl. A47l 13/16
U.S. Cl. 15—244 R 8 Claims



A universal replaceable sponge mop head includes a sponge block having a rectangular backing plate cemented to a face thereof. The backing plate has integrally formed therewith a pair of longitudinally spaced fasteners, each including a pair of similar transversely spaced apertured resilient legs, provided with longitudinal ridges directed toward each other. Locating tabs project from the backing plate rear edge and the side edges are medially inwardly offset for the reception of a tool. Longitudinally spaced fastener receiving apertures are medially formed in the backing plate.

3,616,482
SUCTION OPERATED WASHING AND CLEANING APPARATUS
Wladyslaw Brycki, 19 Mayfield Road, Liverpool 19, England
Filed Nov. 13, 1967, Ser. No. 683,097
Int. Cl. A47l 7/00
U.S. Cl. 15—321 2 Claims



The present suction cleaning device is a part of or for attachment to a source of suction such as a vacuum cleaning machine and includes a nozzle with a liquid supply and a suction tube opening in said nozzle and a container connected to said suction tube and the source suction for removing and collecting used liquid from the air passing through said container from said nozzle.

3,616,483
TWISTER TYPE SELF-WRINGING MOP
Jean Mantelet, Paris, France, assignor to Moulinex S.A., Bagnolet, France
Filed Apr. 13, 1970, Ser. No. 27,633
Claims priority, application France, May 8, 1969, 6914803; Feb. 13, 1970, 7005113
Int. Cl. A47l 13/142
U.S. Cl. 15—120 A 20 Claims

A mop for cleaning floors and windows comprises an absorbent pad carried by a handle provided with mechanical means for expressing liquid from the pad. The

pad comprises a sponge sheathed in a wrapper such as sackcloth and has secured at its opposite ends hubs one of which is rotatable relative to the other through the medium of a rod which is rotated by mechanical means

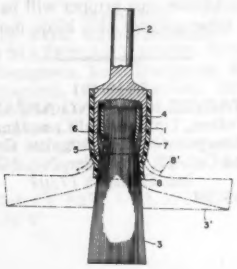
associated with the handle. The second of the hubs may be partially rotatable through a predetermined angle. The relative rotation of the hubs causes twisting of the pad in a manner which simulates hand wringing.

3,616,484

ROTARY BRUSH WITH COLLAR

Vernon K. Charvat, Bay Village, Ohio, assignor to The Sherwin-Williams Company, Cleveland, Ohio

Filed Mar. 9, 1970, Ser. No. 17,435
Int. Cl. A46b *3/10*
U.S. Cl. 15—180 6 Claims



A power driven rotary end brush having a unitary tubular collar mounted on the bristle holding element and encircling the bundle of bristles in the region where the latter emerge from the holder, such collar being resiliently deformable and pre-stressed to exert an active controlled pressure grip within a predetermined pressure range upon such bundle of bristles in both static and dynamic conditions of the brush.

3,616,485

DETACHABLE WINDSHIELD WIPER BLADE UNIT

William J. Quinlan and Lawrence L. Huver, Hastings, Mich., assignors to Hastings Manufacturing Company, Hastings, Mich.

Continuation-in-part of application Ser. No. 725,325, Apr. 30, 1968. This application Dec. 10, 1969, Ser. No. 883,928
Int. Cl. B60s *1/02*
U.S. Cl. 15—250.42 10 Claims

A flexible wiper element supported by a resiliently flexible backing strip. In some embodiments the wiper element and backing strip are bonded together. In other embodiments the backing strip includes a pair of transversely spaced strip members which retain the wiper element therebetween. Longitudinal edge portions of the backing strip are embraced by the usual claws of a wiper

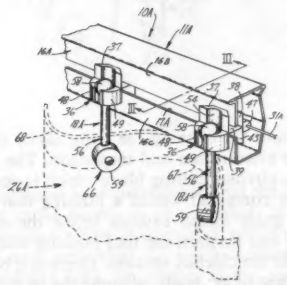
pressure unit, and longitudinally spaced detents are provided on the backing strip to releasably or snap-fittingly receive one of the claws between them, whereby to releasably hold the blade unit and pressure unit in assembled relation.

3,616,486

SWIVEL SUPPORTED DRAPERY HANGER FOR USE WITH TRAVERSE RODS HAVING A REARWARDLY OPENING SLOT

James A. Ford, David E. Bell, and Paul P. Clark, Sturgis, Mich., assignors to Kirsch Company, Sturgis, Mich.

Continuation-in-part of application Ser. No. 676,104, Oct. 18, 1967. This application Sept. 23, 1969, Ser. No. 860,388
The portion of the term of the patent subsequent to Aug. 4, 1987, has been disclaimed
Int. Cl. E05d *13/02*; A47k *13/16*
U.S. Cl. 16—87.2 12 Claims



A drapery material carrier system having a hollow traverse rod with at least one rearwardly opening slot therein. A pluality of carriers, each projecting through the rearwardly opening slot, are movable along the rod and have a first portion within the rod greater in dimension than the width of the slot. A second portion externally of the traverse rod is either fixably or swivelably connected to the first portion and has hanger means associated therewith for supporting the drapery material. An elongated flexible element is arranged along the rod and each of the carriers is formed of a moldable synthetic organic plastic material and connected at spaced intervals to and along the flexible element by having a portion thereof molded therearound.

3,616,487

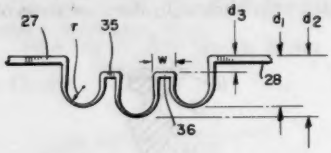
BOX HINGE

Timothy E. Dearth, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Mar. 10, 1969, Ser. No. 805,466
Int. Cl. E05d *9/00*
U.S. Cl. 16—150 1 Claim

A hinge design formed from plastic sheet material susceptible to formation by heat and pressure whereby two

flush surfaces may be integrally hinged. The hinge is formed by conforming plastic sheet material into three



longitudinal valleys in a mold which are separated by a pair of longitudinal ridges.

3,616,488

APPARATUS FOR OPENING THE BODY CAVITY OF A POULTRY CARCASS

William A. Barefield, Hall County, near Gainesville, Ga., assignor to J. D. Jewell, Inc., Gainesville, Ga.

Original application Oct. 28, 1966, Ser. No. 590,388, now Patent No. 3,518,718, dated July 7, 1970. Divided and this application Oct. 13, 1969, Ser. No. 870,705

Int. Cl. A22c *21/00, 21/06*

U.S. Cl. 17—11 **4 Claims**

A cutting tool for opening the body cavity of chickens to allow easy evisceration and inspection. The tool has a power driven, circular cutting blade which is power driven from a motor contained within a housing that is held in the hand. A guide means extends below the edge of the cutting blade and beneath the tool housing and hand and is inserted into the chicken carcass. There is a blade shield around the front of the blade whereby the only entrance to the blade is between the housing and the insertion member.

3,616,489

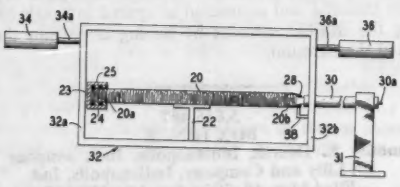
METHOD AND APPARATUS FOR MOISTURIZING SHIRRED CASING STICKS

David Voo, Park Forest, and Louis L. Winokur, Evanston, Ill., assignors to Union Carbide Corporation

Filed May 10, 1967, Ser. No. 637,537

Int. Cl. A22c *13/00, 11/02;* **B08b** *3/02*

U.S. Cl. 17—42 **7 Claims**



Shirred casing sticks are moisturized with water after being shirred but prior to being packaged into cartons for subsequent shipment.

3,616,490

MACHINE FOR BLOW MOLDING HOLLOW PLASTIC ARTICLES

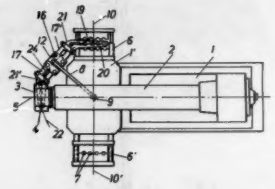
Tibor Szabo, Heidenheim (Brenz), Germany, assignor to Firma J. M. Voith GmbH, Heidenheim, Germany

Filed Jan. 21, 1969, Ser. No. 792,295

Claims priority, application Germany, Jan. 23, 1968, P 17 04 374.2

Int. Cl. B29d *23/03*

U.S. Cl. 18—5 BT **4 Claims**



A blow molding machine has an extruder head with a vertically disposed nozzle for extruding a tubular parison of a thermo plastic synthetic material corresponding in length to the article to be molded. The extruded parison is gripped by a gripping and transfer arrangement which is pivotally mounted on the frame of the machine for pivotal movement in a horizontal plane. Two blow molding stations are each mounted on opposite sides of the machine. The vertical pivotal axis of the gripper and transfer mechanism is so positioned at the side of the extruder head directed toward the machine frame that pivotal movement of the gripper mechanism transfer the parisons from the extruder head to a blow molding station. The gripper mechanism comprises a pivot arm with a gripper on each side of the arm so that in the end positions of the gripper mechanism one gripper will be at the extruder head and the other gripper at a blow molding station.

3,616,491

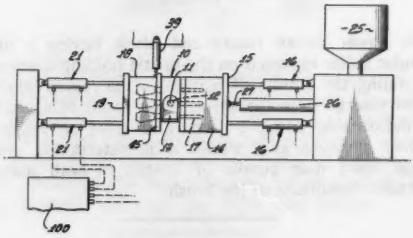
CONTAINER MOLDING APPARATUS

Gary L. Vollers, Upland, Calif., assignor to Pactra Incorporated, Los Angeles, Calif.

Filed Oct. 27, 1969, Ser. No. 869,564

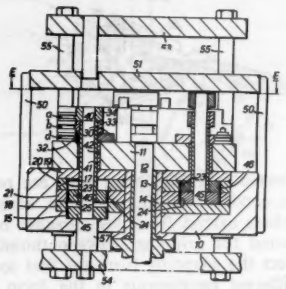
Int. Cl. B29c *17/07*

U.S. Cl. 18—5 BJ **5 Claims**



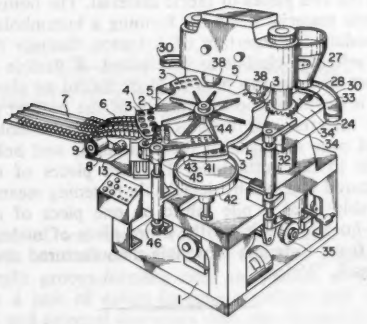
A plastic parison is extruded over a blow nozzle at a forming station; the parison and nozzle are transferred to a blowing station where blowing of the parison into hollow object (for example, a container) form is accomplished; a neck mold releases the container neck; and the blow mold separates the container from the blow nozzle and away from the neck mold, and then releases the container, initial release of the container from the blow mold cavity also being effected during the separation from the blow nozzle.

3,616,492
MOULDING
Bartholomew Camprubi, 29 Campden Road, Ickenham, Middlesex, England
Filed Feb. 14, 1969, Ser. No. 799,315
Int. Cl. B29c *9/00*
U.S. Cl. 18—20 RR 24 Claims



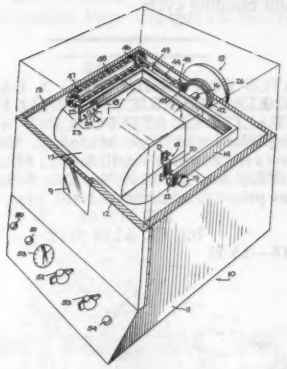
A machine is disclosed for the automatic separation and realignment of parts of a sub-mould in which an article such as a commutator is produced on a separate moulding machine. The machine incorporates a number of separable carriers which are automatically moved to carry the sub-mould parts away from one another to enable operations to be carried out on at least some of the sub-mould parts, e.g. ejection of the article moulded and subsequent cleaning, followed by automatic insertion of mould inserts prior to closure of the sub-mould ready for a further moulding operation.

3,616,493
APPARATUS FOR COMPRESSION MOULDING POWDER MATERIAL WITHIN CONTAINERS
Kei Okubo, Neyagawa, Toru Horiguchi, Kadoma, Miyoji Nakai, Neyagawa, and Haruhisa Shimada, Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Mar. 24, 1970, Ser. No. 22,339
Claims priority, application Japan, Mar. 31, 1969, 44/24,940
Int. Cl. B29c *3/02, 3/04, 3/06*
U.S. Cl. 18—20 C 4 Claims



An apparatus for supplying powder material into a plurality of containers such as cans and compression moulding said powder material into a required shape at the same time within said plurality of containers, which apparatus comprising an intermittently rotated table formed at its periphery with a plurality of angularly equally spaced protruded portions and extending radially outwardly, container holding means provided in said each protruded portion of the table, and means for supplying said powder material into and subsequently compression moulding said powder material into a predetermined desired shape within said plurality of containers simultaneously, whereby the containers having therein moulded powder material of a required shape can be produced in large numbers during a single rotation of the table, said apparatus being suitable in particular for moulding anode depolarizer for the cell.

3,616,494
TEACHING APPARATUS FOR ROTATIONAL MOLDING OF PLASTICS MATERIALS
Howard Natter, 185 Grandview Blvd., Yonkers, N.Y. 10710
Filed Jan. 20, 1970, Ser. No. 4,245
Int. Cl. B29d *23/00;* B29c *5/00*
U.S. Cl. 18—26 RR 12 Claims

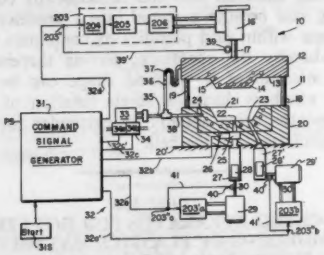


The apparatus is constructed so that the mold is rotated while the mold holder is also rotated. In this way, the plastic material which is contained within the mold is allowed to uniformly coat the inside surfaces of the mold and to solidify into the shape of the mold. A hollow molded plastic structure is thus obtained under gravity forces.

3,616,495
MOLDING APPARATUS
Jerome H. Lemelson, 85 Rector St., Metuchen, N.J. 08840
Continuation-in-part of applications Ser. No. 421,860 and Ser. No. 421,817, both Dec. 29, 1964, and Ser. No. 439,549, Mar. 15, 1965, which in turn are continuations-in-part of application Ser. No. 734,340, May 9, 1958, now Patent No. 3,173,175. This application also is a continuation-in-part of application Ser. No. 142,405, Oct. 2, 1961, now Patent No. 3,422,648. This application Apr. 15, 1968, Ser. No. 721,401
Int. Cl. B29f *1/00*
U.S. Cl. 18—30 CK 16 Claims

An apparatus and method for the controlled molding of materials is provided whereby a plurality of molding variables may be predeterminately controlled in accordance with variations in the molding materials, size and shape of the molded parts and desired physical characteristics of the finished article. Molding variables such as movement of one or more mold components, timing of the injection of molding material, variations in flow of molding material and heating or cooling of the mold walls

may be preprogrammed so as to each vary predetermined degrees during a molding cycle so that such variables increase and/or decrease in predetermined relationship to each other to provide a molded article having predetermined and optimum physical characteristics.



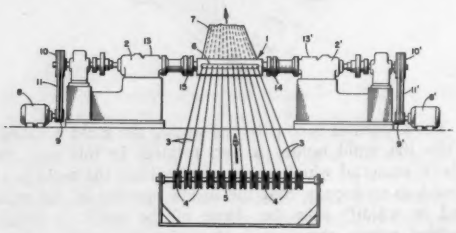
In one form of the invention, molding variables are controlled by the reproduction of prerecorded analog signals from a recording member which signals are used to variably control motors controlling the molding variables. The analog signals may be derived from transducers indicating variations in said motors during the operation of an optimum molding cycle.

3,616,496

APPARATUS FOR PRODUCING A BAND OF UNCURED ELASTOMERIC MATERIAL EMBEDDING A PLURALITY OF REINFORCING WIRES

Attilio Anglioletti and Nino Madonini, Milan, Italy, assignors to Industrie Pirelli S.p.A., Milan, Italy

Filed July 28, 1969, Ser. No. 845,386
Claims priority, application Italy, Mar. 15, 1969, 839,577/69
Int. Cl. A22b *5/08*
U.S. Cl. 18—13 H **7 Claims**



Apparatus for producing a band of uncured elastomeric material in which a reinforcement in the form of a plurality of strands disposed parallel to each other is embedded. The apparatus comprises a generally rectangular hollow extrusion head having a discharge opening, parallel guides in the extrusion head for receiving the strands and guiding the strands to an elongated discharge opening in one wall of the extrusion head, and means communicating with the extrusion head for supplying elastomeric material to the extrusion head so that the strands may be embedded in the elastomeric material as the latter is extruded in uncured condition and in the form of a band from the extrusion head.

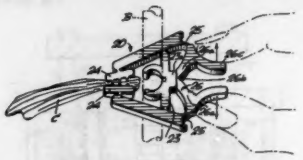
3,616,497

INTEGRAL CLAMPING INSTRUMENTS FOR MEDICAL AND SURGICAL APPLICATIONS

Vincent J. Esposito, Jr., Box 741, Wayne, N.J. 07470

Filed June 24, 1970, Ser. No. 49,337
Int. Cl. A44b *21/00;* **A61b** *17/12*
U.S. Cl. 24—81 HS **11 Claims**

An integral clamping instrument, molded of elastomeric material, has a pair of arms, each being pivotally mounted at a midportion thereof to opposite ends of a rigid bar which acts as a fulcrum. On one end the arms carry opposing jaws and the other ends are hinged to a spreader comprising two hinged half sections which are adapted to snap across a straight-line maximum length condition between a first angular relaxed position, wherein the other arm ends are free to move toward each other for opening the jaws, to a second angular locked



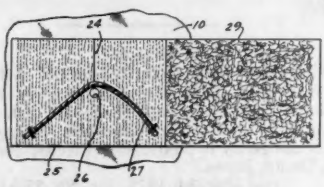
position, wherein said other arm ends are retained in a spread apart condition closing the jaws. Finger manipulatable members extend from the spreader half sections and are located for gripping between thumb and forefinger to effect the snapping from the first to the second position. Different instruments in the form of retainer clips, sponge forceps or hemostats are readily fashioned by varying the size and configuration of the arms, jaws and finger manipulatable members.

3,616,498

BUTTON PROTECTOR

Burton L. Rosenthal, 3707 W. North Shore, Lincolnwood, Ill. 60045

Filed June 10, 1969, Ser. No. 831,966
Int. Cl. A44b *1/18;* **D06f** *29/00*
U.S. Cl. 24—90.5 **1 Claim**



Protector for buttons on clothes during cleaning consisting of two pieces of fabric material sewed together along one edge of each piece and hinging the pieces together to accommodate the top piece to fold over the bottom piece and protect a button on a garment and between the two pieces of fabric material. The bottom piece of fabric material has a slit forming a buttonhole, to accommodate the insertion of a button through the hole when sewed to clothes to be cleaned. A flexible retainer member in the form of a cord or thread of plastic material is sewed to the top surface of the bottom piece of fabric material and extends over the buttonhole to be slipped over a button in the buttonhole and hold small buttons to the buttonhole. The two pieces of material are secured together by detachable fastening means which preferably is of a pile fabric on one piece of material and a hooked fabric on the other piece of material and made from fastening materials manufactured under the trademark "Velcro."

3,616,499

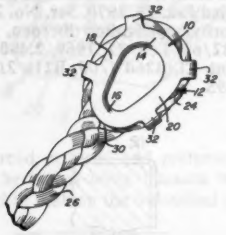
ROPE THIMBLE

Archie J. Lowery, Sr., 500 Ave. J, Marrero, La. 70072

Filed Jan. 14, 1970, Ser. No. 2,865
Int. Cl. F16g *11/04*
U.S. Cl. 24—123 G **6 Claims**

An elongated open frame including first and second opposite semi-cylindrical end portions opening toward

each other and connected by generally straight opposite side frame portions extending between corresponding sides of the end portions. The radius of curvature of the first end portion is generally twice the radius of curvature of the second end portion and the side frame members are convergent toward the second end portion. Further, side and end portions define a semi-cylindrical outwardly opening continuous groove extending about the outer periphery of the frame for seatingly receiving the

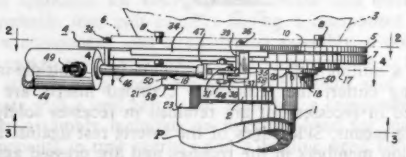


inner peripheral portions of a cable or rope eye splice therein. Also, the radius of curvature of the semi-cylindrical groove is gradually increased in the area of the smaller radius end portion of the frame and the frame includes peripherally spaced inwardly opening generally semi-cylindrical strap portions formed integrally with the frame which, together with the adjacent portions of the groove, define tubular guide portions for retaining a rope or cable eye splice on the frame.

ERRATUM

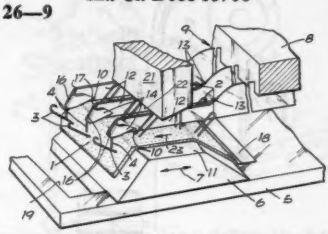
For Class 24—205.11F see:
Patent No. 3,616,939

3,616,500
MEANS FOR FORMING GASKET GROOVES IN CONCRETE PIPE SPIGOTS
Harry T. Peck and Harold W. Schneider, Arlington, Tex., assignors to Gifford-Hill Pipe Company, Dallas, Tex.
Continuation-in-part of application Ser. No. 796,118, Feb. 3, 1969. This application Oct. 22, 1969, Ser. No. 871,509
Int. Cl. B28b *21/00*
U.S. Cl. 25—39 **32 Claims**



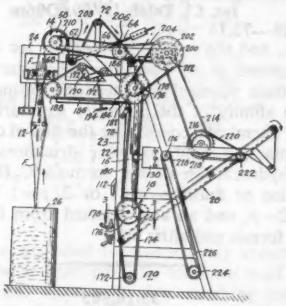
Method of and means for forming gasket-receiving grooves in concrete or cement asbestos pipe spigots having a split groove-forming ring engaged in a channel between a pair of spigot-forming members and of less internal and external diameters than the channel for contraction and expansion into and out of operative position, the ring and members being adapted to undergo limited rotation relative to a spigot and its groove for breaking the adhesion of the concrete thereto. The invention includes means for circulating a cleansing fluid through its channel and around the expanded ring to prevent setting up of cement.

3,616,501
LOOP-CUTTING APPARATUS
Norbert Stefan Waller, Weil im Schonbuch, Germany, assignor to Fa. Gottlieb Binder, Baden-Wurttemberg, Germany
Filed June 23, 1970, Ser. No. 48,987
Claims priority, application Germany, June 27, 1969, P 19 32 553.2
Int. Cl. D06c *13/08*
U.S. Cl. 26—9 **7 Claims**



An apparatus for cutting loops, which project from a surface, into two parts of unequal length, using a row of comb-like teeth whose free ends are bent back and formed each with a curved cutting edge. The row of curved cutting edges co-operates in scissors fashion with a transverse knife edge for cutting loops engaged on the free ends of the teeth.

3,616,502
APPARATUS FOR TREATING OF TUBULAR FABRICS
Edward I. Aronoff, 605 Dorais St., St. Laurent, Quebec, Canada
Filed June 10, 1969, Ser. No. 831,956
Int. Cl. D06c *5/00*
U.S. Cl. 26—55 R **4 Claims**

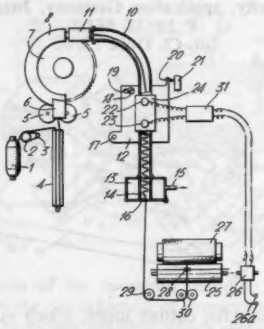


The apparatus includes in succession a floating pilot spreader for spreading a tubular fabric from twisted rope shape to a floating spreader for laterally overstretching the fabric, guide means preceding the overstretching spreader for aligning the pattern of the tubular fabric as it is fed onto the spreader, rolls for taking the fabric off the spreader and a conveyor for carrying the fabric to a subsequent finishing step, such as drying.

3,616,503
METHOD FOR CRIMPING AND THERMALLY TREATING YARN
Denis Albert Edward Mattingly, London, England, assignor to The Klinger Manufacturing Company Limited, London, England
Filed Jan. 3, 1968, Ser. No. 695,369
Claims priority, application Great Britain, Jan. 6, 1967, 892/67
Int. Cl. D02g *1/12*
U.S. Cl. 28—72.14 **6 Claims**

Crimped yarn in the form of a plug, such as is produced by longitudinally compressing and bunching the yarn in

a stuffer box, is conveyed, while in the plug form, through a treating zone with the aid of a flow of gas. In the treating zone the plug of crimped yarn may be subjected to



heating and/or cooling treatment to improve the properties of the yarn. The flow of gas is induced through the treating zone in the direction of travel of the plug preferably by suction at the exit end of the treating zone.

3,616,504

LINEAR POLYESTER FIBER SHRINKAGE WITH HNO_3 OR FORMIC ACID IN A HALOGENATED HYDROCARBON AND THE PRODUCTS SO SHRUNK

Wolfgang K. F. Otto, Spartanburg, S.C., assignor to Deering Milliken Research Corporation, Spartanburg, S.C.

No Drawing. Filed Oct. 23, 1968, Ser. No. 770,112
Int. Cl. D04b *19/00;* D06m
U.S. Cl. 28—72.16 **25 Claims**

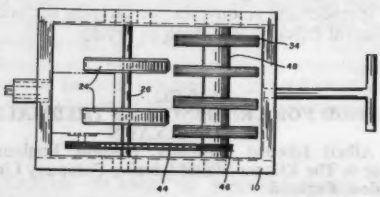
Process, and the resulting products, for treating materials composed of or containing polyester structures to enhance their physical and aesthetic properties and improve the affinity of the polyester structures to dyestuffs and other chemicals, comprising the step of contemporaneously contacting solid polyester structures with a halogenated hydrocarbon of the formula $C_nH_mX_p$, wherein X=chlorine or fluorine, n=1 or 2, p=1 to $2n+1$, and $m=2n+2-p$, and an acid selected from the group consisting of formic and nitric acid.

3,616,505

PAINT AND SCALE REMOVING APPARATUS

Daniel Klockner, Jr., 294 Boulevard, Mountain Lakes, N.J. 07046

Filed Feb. 16, 1970, Ser. No. 11,429
Int. Cl. B21c *43/00*
U.S. Cl. 29—81 **11 Claims**



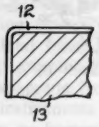
A brush machine includes a grouping of adjustably positioned brushes carried on a shaft mounted on a frame adapted for hand manipulation and operator propulsion. The brushes are rotatably driven in the frame which is pivotally supported so that the brushes may be brought into localized engagement with the top of a structural beam so as to remove at selected positions and spacing the scale, dirt and paint on top of the beam. The cleaned surface is thus in condition for the welding of studs to the top of the beam.

3,616,506

INSERT FOR MACHINING STEEL OR SIMILAR MATERIAL

Carl Sven Gustaf Ekemar, Lannersta, Sweden, assignor to Sandvikens Jernverks Aktiebolag, Sandviken, Sweden

Filed Jan. 13, 1970, Ser. No. 2,540
Claims priority, application Sweden, Jan. 2, 1969, 32/69; Feb. 21, 1969, 2,400/69
Int. Cl. B26d *1/00;* B21k *21/00*
U.S. Cl. 29—95 **21 Claims**



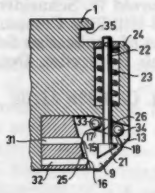
In the field of covering a face of a cemented carbide cutting body with a layer of wear-resistant material, the improvement consists in depositing said material from a gaseous phase containing a gaseous compound of a carbide-forming metal, hydrogen and methane or similar gaseous hydrocarbon, said deposition being effected at an elevated temperature and at sub-atmospheric pressure.

3,616,507

MILLING CUTTER

Sven Axel Olof Wirfelt, Sandviken, Sweden, assignor to Sandvikens Jernverks Aktiebolag, Sandviken, Sweden

Filed July 10, 1969, Ser. No. 840,685
Claims priority, application Sweden, July 12, 1968, 9,598/68
Int. Cl. B26d *1/00*
U.S. Cl. 29—105 **16 Claims**



In a milling cutter, more particularly a multiple-insert milling cutter, the removably clamped inserts are not locked in recesses but are retained in recesses solely by spring means. Side edges of the inserts rest against fixed location members in the recesses and are pressed against said members by cutting forces arising from use of the tool.

3,616,508

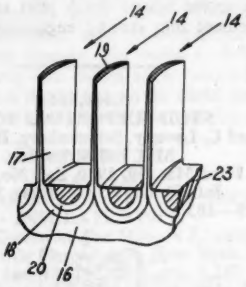
METHOD OF MAKING COMPRESSOR OR TURBINE ROTOR OR STATOR BLADES

John Stanley Wallett, Allestree, Derby, England, assignor to Rolls-Royce Limited, Derby, England

Filed Jan. 27, 1969, Ser. No. 794,138
Claims priority, application Great Britain, Feb. 8, 1968, 6,219/68
Int. Cl. B21k *3/04;* B23p *15/02, 15/04*
U.S. Cl. 29—156.8 R **5 Claims**

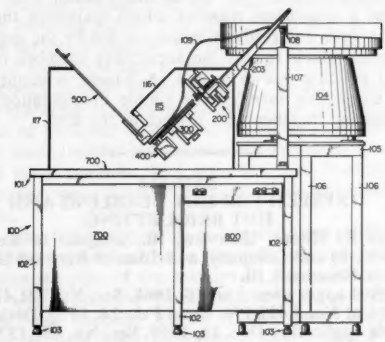
A method of making an annulus of blades for a gas turbine engine is proposed in which a blade rov/ is

formed from an annular array of pieces, each comprising a blade flank, an interconnecting portion, and an opposing flank of an adjacent blade. The pieces are made



from fiber reinforced material and preferred method of manufacture of the pieces using filament winding techniques are utilized in making the individual pieces.

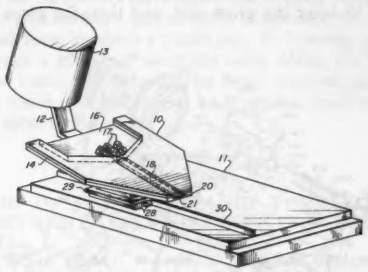
3,616,509
IN-LINE UNIT CARRIER LOADER
Albert W. Zemek and Stephen Gelo, Jr., Binghamton, and Robert H. Holmes, Marathon, N.Y., assignors to Universal Instruments Corporation, Binghamton, N.Y.
Filed Feb. 12, 1970, Ser. No. 10,719
Int. Cl. B23g *7/10;* H01r *43/04;* H05k *13/00*
U.S. Cl. 29—203 **29 Claims**



An apparatus for inserting dual in-line lead electrical components into unit carriers having a component supply, a component lead straightening assembly, a component escape mechanism which allows components to leave said straightening assembly and which aligns said components with a unit carrier for assembly, a component insertion assembly including an insertion head for loading components in unit carriers and a loading head for supplying loaded unit carriers to a magazine, and a magazine escape assembly to automatically supply a fresh magazine when another is filled with loaded unit carriers. The system is pneumatically controlled.

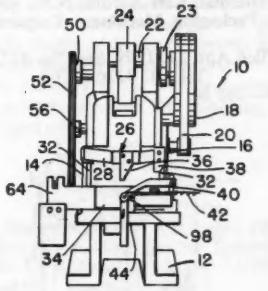
3,616,510
PREFORM LOADER
Alfred R. Kroehs, Belford, N.J., assignor to Alpha Metals, Inc., Jersey City, N.J.
Filed June 23, 1969, Ser. No. 835,676
Int. Cl. H05k *13/04;* B23g *7/10*
U.S. Cl. 29—203 B **3 Claims**

A preform loader wherein contact pins to be connected to a circuit board are moved through a slot in a channel containing preforms, and in so doing, each pin picks off a preform by entering a hole in the preform and sliding it



out of the channel, overcoming a deflectable detent at the end of the channel.

3,616,511
COILFORM ORIENTER
Robert W. De Lisle, Dover, Pa., assignor to Berg Electronics, Inc. New Cumberland, Pa.
Filed Dec. 15, 1969, Ser. No. 885,305
Int. Cl. H05k *13/04;* H01r *43/04*
U.S. Cl. 29—203 R **12 Claims**

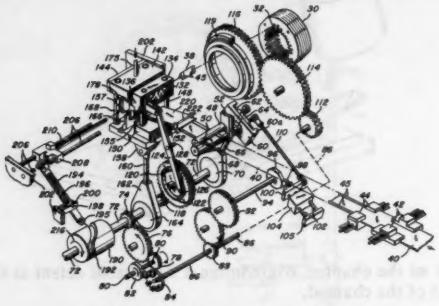


A machine is provided for successively staking terminals onto a tubular coilform. The coilform is of the type used in electrical apparatus. The machine includes a mandrel structure including an outer mandrel shaft for indexing the coilform during the staking operation and an inner mandrel shaft to initially receive the coilform and turn it to a position where a slot in the coilform will engage a finger on the outer mandrel shaft to thereby orient the coilform with respect to the outer mandrel shaft and lock the coilform to the outer mandrel shaft for rotation therewith.

3,616,512
APPARATUS FOR INSERTING INSULATOR PIECES INTO STATOR SLOTS
Robert C. Appenzeller, Robert E. Lang, and Donald A. Ludwig, Dayton, Ohio, assignors to Machine Products Corporation, Dayton, Ohio
Filed Dec. 1, 1969, Ser. No. 881,238
Int. Cl. H02k *15/00*
U.S. Cl. 29—205 E **20 Claims**

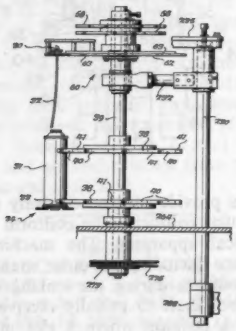
Apparatus for inserting pieces of insulation or insulator material into slots of stators of electric machines in which the stator slots are of various dimensions. A continuous strip of insulation material is employed. The apparatus folds the strip at opposed edges thereof and thereby "cuffs"

the strip at each of the opposed edges thereof. The strip is then severed to provide a piece of the insulation material which is of the proper length to insulate a given stator slot. The piece of insulation material is then formed properly to enter the given slot, and then the piece is forced



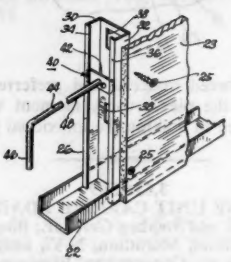
into the given slot. Due to the fact that the stator slots are of various dimensions, the apparatus is arranged to cut and form each piece of insulation material, particularly for the slot within which the piece is intended to be inserted.

3,616,513
CAPPING EQUIPMENT
George H. Dimond, East Aurora, N.Y., assignor to Consolidated Packaging Machinery Corporation, Buffalo, N.Y.
Filed Apr. 21, 1969, Ser. No. 817,850
Int. Cl. B23p *19/04*
U.S. Cl. 29—208 B **31 Claims**



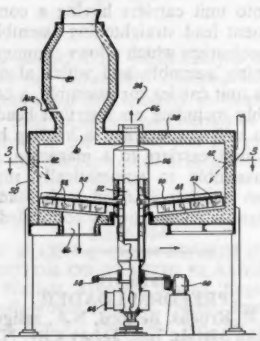
A machine for applying closure elements having dip tube extensions to aerosol containers which includes a multi-station rotary turret arranged to receive the containers from an infeed conveyor. A pair of spaced-apart sorters are provided for alternately feeding the closure elements to a feeding mechanism which directs the elements to a predetermined pick-up location adjacent the turret. A plurality of capping chucks mounted on the turret receive successive closure elements from the pick-up location, and each chuck is effective to grip its element through the use of a plurality of spring biased chuck jaws. When a given chuck picks up a closure element, an extension guide mechanism adjacent the chuck is effective to move two overlapping finger members around the upper portion of the dip tube extension. The finger members are then directed downwardly along the extension to a position immediately above one of the containers on the turret, and the chuck descends until the extension has entered the mouth of the container, at which point the finger members move out of the way. Upon continued downward movement of the chuck, the spring biased chuck jaws resiliently urge the closure element into seating engagement with the container.

3,616,514
STUD SUPPORTING TOOL
Richard C. Laverty, Schaumburg, Ill., assignor to MSL Industries, Inc.
Filed Mar. 30, 1970, Ser. No. 23,614
Int. Cl. B25b *3/00;* **E04g** *21/16*
U.S. Cl. 29—283 **12 Claims**



A tool used to prevent the channel-shaped metal studs used in drywall construction from bending during connection of the drywall to the metal studs. The tool includes a supporting member which maintains the width of the studs and resilient means carried by the supporting member which retains the supporting member in a desired position within a stud. A handle is connected to the supporting member for simple manipulation of the supporting member with respect to the stud.

3,616,515
SYSTEM FOR HOT DE-OILING AND HOT BRIQUETTING
James E. Moore, Glenview, Ill., assignor to Komarek-Greaves and Company, a division of Berwind Corporation, Rosemont, Ill.
Original application Apr. 15, 1968, Ser. No. 721,474, now Patent No. 3,497,190, dated Feb. 24, 1970. Divided and this application Dec. 18, 1969, Ser. No. 886,157
Int. Cl. B23q *17/00;* **C21b** *11/00*
U.S. Cl. 29—403 **7 Claims**



A system for hot de-oiling and hot briquetting material wherein the material is heated to burn off or vaporize foreign substances and is then transported to a briquetting

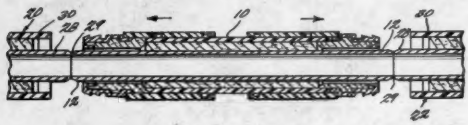
machine for forming of the material into briquets. The improvements of the invention relate to a furnace construction and method of operation for heating the material. The furnace construction includes a single hearth providing a combustion zone whereby the material can be fed to the combustion zone from inlet means defined at the side of the furnace. An outlet is defined in the hearth and movable rake means are provided for moving the materials within the furnace to the outlet for discharge and for delivery of the materials to briquetting equipment.

3,616,516

METHOD AND APPARATUS FOR REPAIRING INSULATED PIPE

Winfield F. Corriston, Far Hills, N.J., assignor to Johns-Manville Corporation, New York, N.Y.

Filed Jan. 12, 1970, Ser. No. 2,237
Int. Cl. B22d 19/10; F01b 25/02; F01c 21/12
U.S. Cl. 29—401 14 Claims



Method and apparatus are described for repairing insulated pipe. The insulated pipe repair apparatus comprises an inner transfer pipe, an outer conduit surrounding the inner transfer pipe forming an annular space having insulation material therein with the outer conduit supporting slidable coupling means. The apparatus is used in the repair of insulated pipeline by removing a section of the insulated pipeline which is to be replaced and preparing the exposed sections of the remaining insulated pipeline. The preparation consists of cutting off a predetermined amount of the outer casing and insulation material leaving the inner transfer pipes extending outwardly from the end of outer conduits. End seals are then inserted into the annular space formed by removal of the insulation material.

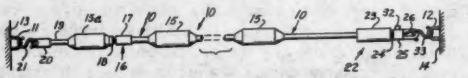
The pipe repair apparatus is lowered into position so that its inner transfer pipe is coaxially aligned with the inner transfer pipe of the sections of the insulated pipeline at which time the inner transfer pipes are secured together. The coupling means on the repair apparatus are moved away from the outer casing, bringing them into contact with the end seals. The space left by the movement of the coupling means, away from the outer casing, is filled with insulation material and sealed so that a continuous insulated pipeline is formed.

3,616,517

MEANS AND METHOD OF CLAMPING, CUTTING AND EXTENDING CABLE

David A. Stanwood and Billy G. Epperson, Jr., West Covina, Calif., assignors to Swimquip, Inc., El Monte, Calif.

Filed Aug. 11, 1969, Ser. No. 849,103
Int. Cl. B23p 17/00, 19/00; B21d 39/00
U.S. Cl. 29—414 7 Claims



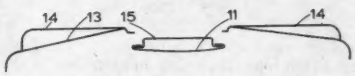
A cable clamping and cutting device comprising a body having a bore through which the cable passes and a hollow nut threadable onto the body, so that the cable passes through the nut and the bore. Tapered wedging elements are placed within the nut which engage correspondingly tapered inner surfaces of the nut so that when the nut is turned on the threads the wedge members grip the cable. The body portion has a second bore, intersecting the first-mentioned bore, in which a punch may be inserted, which when struck a blow will sever the cable within the body while the cable is clamped. The body contains an eye member which can be engaged by a suitable hook or the like as a cable termination.

3,616,518

METHOD OF SIMULTANEOUSLY FORMING AN APERTURED PANEL AND A RELATED CLOSURE PANEL

Bernard Brian Hundy, Woodstock, England, assignor to Pressed Steel Fisher Limited, Oxford, England

Filed Mar. 18, 1969, Ser. No. 808,249
Claims priority, application United Kingdom, Mar. 21, 1968, 13,679/68
Int. Cl. B23p 17/00
U.S. Cl. 29—414 4 Claims



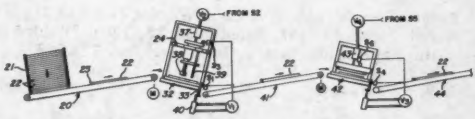
A method of forming an apertured panel and a closure panel for the aperture or for another aperture in a related apertured panel, which includes forming the closure panel and the apertured panel simultaneously from a single sheet of material with the general planes of the panels mutually displaced by a (preferably tapered) wall portion, the wall portion is then severed to separate the panels and the portions of the wall remaining on one or both panels provides material for clinching over or for forming a flanged edge.

3,616,519

REEL FABRICATION

William W. Hanshew, Rte. 1, Brookville, Ohio 45309

Filed July 3, 1969, Ser. No. 838,965
Int. Cl. B23p 19/00, 23/04, 11/00
U.S. Cl. 29—430 30 Claims



Continuous system and method for fabricating reels having circular end discs and a core section, comprising a mechanism for boring and drilling blanks, a printer, a saw mechanism for cutting circular discs from said blanks, an assembly station at which two end discs and a core are positioned in final assembly, a riveting mechanism for securing a disc to each end of each core, conveyor means preceding each of said bore and drill mechanism, printer, saw mechanism, assembly station and riveting mechanism, and actuating switches contacted by said blanks or discs in an automatic movement and positioning thereof to energize the respective mechanism, to hold the blanks or discs in predetermined position and to release the blanks or discs for movement to the next mechanism. The riveting mechanism inserts a blind rivet through aligned holes drilled in an assembled disc and core and on retraction flares the end of the rivet outwardly into clamping engagement to complete the fabrication cycle.

3,616,520

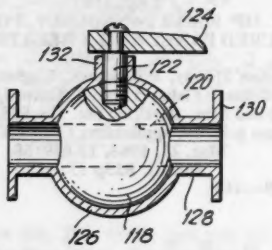
MANUFACTURING ASSEMBLIES OF PRECISION-FITTED RELATIVELY MOVABLE COMPONENTS

Louis Bucalo, Holbrook, N.Y., assignor to Kinemotive Corporation, Farmingdale, N.Y.

Continuation-in-part of application Ser. No. 588,231, Sept. 28, 1966. This application May 22, 1969, Ser. No. 826,992

Int. Cl. B21d *53/00, 53/10*

U.S. Cl. 29—441 13 Claims



A method for manufacturing an assembly of at least two precision-fitted components, wherein at least one of the components is movable relative to the other. One of the components is formed directly on the other by techniques already known in connection with deposition of molecular layers when forming coatings, linings, and the like. However, the materials are selected so that the deposited molecular layers do not adhere to the surface on which they are deposited, or are provided with a strippable coating. As a result the two components will have perfectly complementary surfaces providing a prefect precision fit. Thus, it becomes possible to provide between a pair of components, at least one of which is movable relative to the other, a perfectly precise fit.

3,616,521

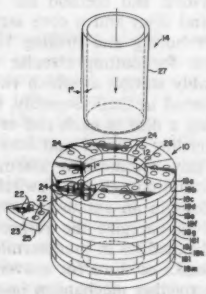
METHOD OF MAKING A PRESTRESSED SEGMENTED CONTAINER

F. George Boggio, Glen Rock, N.J., assignor to Gulf & Western Industrial Products Company, Grand Rapids, Mich.

Original application May 22, 1967, Ser. No. 640,311, now Pat. No. 3,433,382, dated Mar. 18, 1969. Divided and this application Nov. 7, 1968, Ser. No. 774,008

Int. Cl. B23p *11/02*

U.S. Cl. 29—446 2 Claims



An improved method of forming a pressure vessel of the type comprising an outer support cylinder formed from a plurality of discrete ring sectors and having a generally cylindrical bore extending longitudinally therethrough with a sleeve-like member positioned within the bore. The method comprises expanding the segmented outer support cylinder either prior to, or simultaneously with, the insertion of the annular sleeve-like member so that the tendency of the support cylinder to contract produces hoop compression in the sleeve-like member.

3,616,522

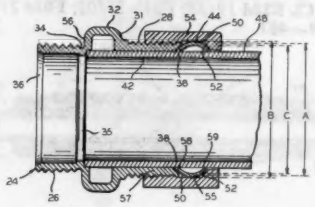
METHOD OF MAKING COMPRESSION FITTING

Nathan H. Rudolph, Aurora, and Ronald G. Boyd, Galva, Ill., assignors to All-Steel Equipment Inc., Aurora, Ill.

Filed Dec. 4, 1968, Ser. No. 781,188

Int. Cl. B23p *17/00, 25/00*

U.S. Cl. 29—458 6 Claims



The disclosure pertains to a compression fitting for connecting conduit to outlet boxes and the like in which the body member is made by a series of press forming operations on a tubular blank to define a central upset portion having a hex configuration, and roll formed threaded end portions of different external diameters in which the diameter of the tubular blank is equivalent to the pitch diameter of the large end of the completed body member, and an indentation is rolled into the blank adjacent its smaller end to define the maximum throat size of the fitting and a stop for the conduit when received in the body member larger end. In making the body member, the blank is formed by severing same from the tubing to include the indentation located adjacent one end of same, the ends of the blank are deburred, the said one end of the blank is necked down to approximately the indentation, the blank is upset intermediate its ends to define the hex configuration, and then the threads are rolled into the blank ends, after which the body member is suitably coated. The reduced end of the body member receives a conventional box engaging lock nut while the larger body member end is equipped with a clamp nut and cooperating gland for fixing the conduit to the fitting. Also disclosed is a special die arrangement for necking down and upsetting the fitting body member.

3,616,523

GLASS LASER WINDOW SEALANT TECHNIQUE

Bernard Smith, Neptune, N.J., assignor to the United States of America as represented by the Secretary of the Army

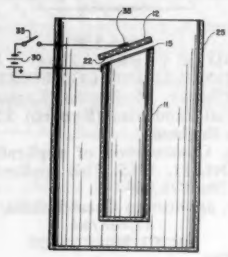
Filed Nov. 24, 1970, Ser. No. 92,392

Int. Cl. B23k *31/02*

U.S. Cl. 29—472.7 8 Claims

A technique for sealing electrically non-conductive optical windows to electrically non-conductive electron discharge device envelopes, such as laser bodies, without distorting or destroying the optical properties of the window, particularly during sealing-in process at temperatures often in excess of about 350 degrees C. The technique involves optically polishing the mating surfaces of the window and the body, coating said surface or edge of the body with a thin electrically conductive or semiconductive sealant, placing the window over the aforesaid

edge and applying a high unidirectional potential between the sealant and the window while heating the body and



window in an oven to a high temperature which is below the softening temperature for the window and body.

3,616,524

METHOD OF MAKING AN ARTICLE, CONSISTING AT LEAST SUPERFICIALLY OF COPPER, SUITABLE FOR THE CONNECTION BY MEANS OF SPOT WELDING

Johannes Wilhelmus Hendrikus Maria de Vries, Emmasingel, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

No Drawing. Filed Feb. 4, 1969, Ser. No. 796,574
Claims priority, application Netherlands, Feb. 9, 1968, 6801828
Int. Cl. B23k *31/02*
U.S. Cl. 29—492 **2 Claims**

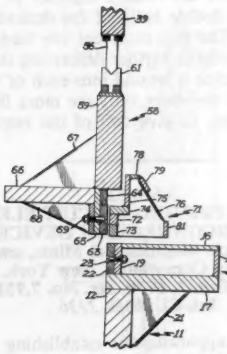
A method of joining a metal article having a copper surface to another metal article by spot welding in which the copper surface is first oxidized to form cuprous oxide and then reduced in a hydrocarbon atmosphere to form a layer of carbon particles between copper particles.

3,616,525

COMBINATION SHEAR AND PRESS BRAKE MACHINE

Lloyd L. Barthel, Elk River, Minn., assignor to Elk River Machine Company, Elk River, Minn.

Filed Oct. 2, 1969, Ser. No. 863,118
Int. Cl. B23p *23/00*
U.S. Cl. 29—560 **8 Claims**



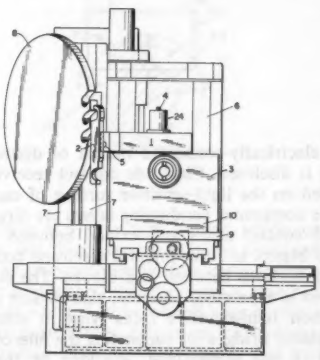
A combination metal shear and press brake machine having a base, an upper beam and a center beam. The beams are relatively movable vertically with respect to the base and to each other. The machine is arranged so that when the machine is to be used as a press brake, the upper beam may be hydraulically driven upwardly and downwardly to bend metal between dies carried by the lower edge of the movable upper beam and by the upper edge of the center beam. When the machine is to be used as a shear, the upper and center beams are secured together to operate as a single movable member and are hydraulically driven upwardly and downwardly to cut metal between cutting blades carried by the lower edge of the center beam and by the upper edge of the base.

3,616,526

TOOL CHANGING DEVICE FOR A MACHINE TOOL

Masaharu Tajima, Kanagawa Prefecture, Japan, assignor to Ikegai Tekko Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 26, 1969, Ser. No. 802,376
Claims priority, application Japan, Apr. 3, 1968, 43/21,483
Int. Cl. B23q *3/157*
U.S. Cl. 29—568 **4 Claims**



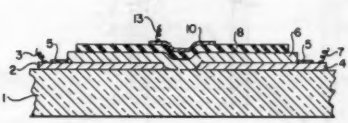
A tool changing device for a machine tool. The device has a tool drum mounted on a tool drum mounting column which is different from the column that carries the headstock. A swing arm is pivotally connected to the headstock and a tool changing arm is rotatably mounted on the swing arm. The tool drum is synchronously moved with the headstock and the swing arm is adapted to transfer the tools between the tool drum and the main spindle of the headstock.

3,616,527

METHOD OF ACCURATELY DOPING A SEMICONDUCTOR MATERIAL LAYER

John L. Janning, Dayton, Ohio, assignor to The National Cash Register Company, Dayton, Ohio

Filed July 15, 1968, Ser. No. 744,991
Int. Cl. B01j *17/34*
U.S. Cl. 29—571 **1 Claim**



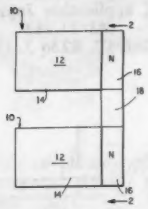
The present invention relates to a method of accurately doping a semiconductor material layer so as to control the electrical conductivity of said doped semiconductor

material layer, such as a doped semiconductor material layer within a thin film insulated gate field effect semiconductor device, by depositing a thin film of dopant atoms upon a substrate, as between a source electrode layer and a drain electrode layer which are upon a substrate, and evaporating said semiconductor material layer upon said thin film of dopant atoms.

3,616,528
SOLID STATE MATRICES

T. O. Paine, Acting Administrator of the National Aeronautics and Space Administration, with respect to an invention of Walter A. Hasbach, West Covina, and John V. Goldsmith, Glendale, Calif.

Filed Nov. 15, 1968, Ser. No. 776,185
Int. Cl. B01j *17/00;* **H01c** *7/08;* **H01j** *9/00*
U.S. Cl. 29—572 **7 Claims**

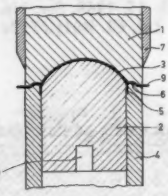


An electrically-connected matrix of discrete solar cell blanks is disclosed. Electrode contact receiving areas are provided on the light-sensitive surface of each blank and discrete continuous conducting layers are directly attached to said contact areas and extend between at least two of said blanks to form integral electrode contacts on and interconnections between said blanks. The cell blanks are disposed in separated, adjacent, side-by-side arrangements with their light-sensitive faces lying in substantially the same plane. Bridges for supporting the interconnection are placed in the separations. Portions of the blanks are masked and metal is deposited through said mask onto said bridges and surfaces to form integral electrode contacts on and interconnections between said separated blanks.

3,616,529
TRANSDUCER AND METHOD OF MAKING SAME

Wilhelmus Hermanus Iding, Emmasingel, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 20, 1968, Ser. No. 754,032
Claims priority, application Netherlands, Aug. 31, 1967, 6711958; July 13, 1968, 6809978
Int. Cl. H04r *31/00*
U.S. Cl. 29—594 **6 Claims**



A method of manufacturing a transducer including pretinning the ends of a coil and of conductor leads, disposing the tinned ends adjacently within the cavity of a mold, injecting a thermosetting resin into the mold cavity and heating the resin to form a diaphragm therein, with the heat from the resin causing the adjacent tinned ends to become soldered, said ends also being embedded in the resin.

3,616,530
METHOD OF FABRICATING A SUPERCONDUCTING COMPOSITE

Peter Francis Chester, Mollington, England, assignor to Imperial Metal Industries (Kynoch) Limited, Wittan, Birmingham, England

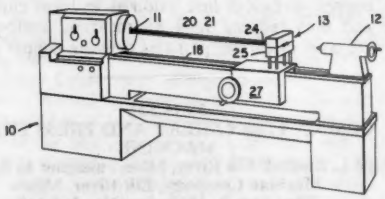
No Drawing. Continuation of application Ser. No. 494,869, Oct. 11, 1965. This application Oct. 28, 1969, Ser. No. 871,969
Claims priority, application Great Britain, Nov. 20, 1964, 47,408/64
Int. Cl. H01v *11/00*
U.S. Cl. 29—599 **5 Claims**

A composite electrically conducting material suitable for carrying large currents comprises an array of Type I superconducting ribbons, layers or filaments in a matrix of normal material of high electrical and thermal conductivities. The superconducting material is preferably an alloy of niobium with titanium or zirconium and the normal material is conveniently copper, silver, aluminum, indium or cadmium.

3,616,531
METHOD FOR MAKING A DOUBLE HELIX TYPE OF SUPPORTED FIRE DETECTOR SENSOR

Maurice E. Tyler, Orinda, Calif., assignor to John E. Lindberg, Lafayette, Calif.

Filed Oct. 21, 1969, Ser. No. 868,013
Int. Cl. H01c *7/04*
U.S. Cl. 29—612 **2 Claims**



A method of providing a double helix for two linearly extending members having quite different rigidities. The more rigid members are twisted together in pairs to deform them into a double helix of the desired number of turns per length. The two members are then unthreaded from each other without further deforming them, and the more flexible member is wound into each of the helically shaped more rigid members, only the more flexible member being deformed, to give two of the required assemblies.

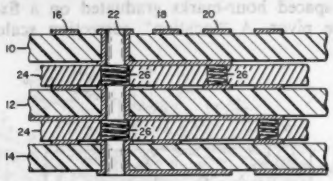
3,616,532
MULTILAYER PRINTED CIRCUIT ELECTRICAL INTERCONNECTION DEVICE

Ronald A. Beck, Bloomington, Minn., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Feb. 2, 1970, Ser. No. 7,931
Int. Cl. H05k *3/36*
U.S. Cl. 29—625 **2 Claims**

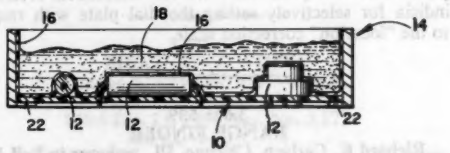
A method and apparatus for establishing interconnections between conductive layers in multilayer printed circuit assembly wherein a solder coated compression type coil spring is inserted into an aperture in an insulating substrate which is positioned between the layers of circuitry which is to be interconnected. Upon heating, the

solder melts to permit the spring to expand and thereby establish contact between the conducted surfaces. When



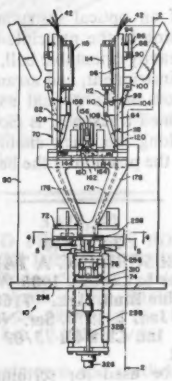
the solder again cools, a positive and extremely reliable connection is established.

3,616,533
METHOD OF PROTECTING ARTICLES IN HIGH TEMPERATURE ENVIRONMENT
Richard T. Heap, Stanton, and Joseph C. Widmont, Newport Beach, Calif., assignors to North American Rockwell Corporation
Filed Oct. 28, 1969, Ser. No. 874,085
Int. Cl. H05k *3/30*
U.S. Cl. 29—626 **13 Claims**



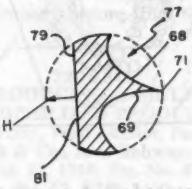
Electrical components mounted on a printed circuit board are protected from heat by covering the components with a viscous coolant in a container conforming to the configuration of each of the components The coolant comprises a viscous liquid suspension of powdered material in water. The liquid suspension provides a heat sink and is cohesive to retain a minimum surface area upon accidental spillage on molten solder or like heated surface area whereby "flash" vaporization is avoided.

3,616,534
BOBBIN LUGGER
Richard W. Black, Manchester, Pa., assignor to Berg Electronics, Inc., New Cumberland, Pa.
Filed Nov. 18, 1969, Ser. No. 877,621
Int. Cl. H05k *3/30, 13/04;* **H01r** *43/04*
U.S. Cl. 29—626 **23 Claims**



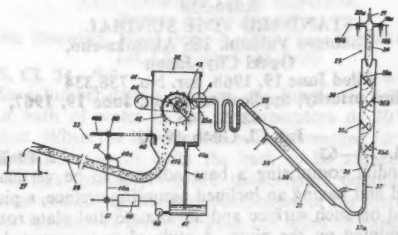
The bobbin lugger of the invention is adapted to simultaneously lug a plurality of electrical terminals to a bobbin structure. In the embodiment illustrated, six separate terminal strips are fed into a terminal feed structure. Individual terminals are severed from each strip and gravity fed into positioning means which are aligned with openings of a bobbin. After being located by the positioning means, the terminals are held in place by clamping means and the positioning means are retracted to expose a portion of each terminal for insertion through openings in the bobbin. The bobbins are individually loaded onto an elevator structure which is positioned beneath the clamped terminals. The elevator structure carries the bobbins up to the terminals. A portion of the terminals is then bent over onto a bobbin surface and the bobbins are then retracted and ejected from the apparatus whereupon the sequence is repeated.

3,616,535
WIRE CUTTING ARTICLE
George J. Ablah, 9100 E. 13th St. 67206, and James B. Townsend, both of Wichita, Kans.
Filed Dec. 30, 1968, Ser. No. 787,678
Int. Cl. B26b *21/26*
U.S. Cl. 30—40.1 **7 Claims**



This invention is a wire type cutting article operable in a magazine type razor having portions for maintaining stability and an outwardly projecting cutting edge shaped from the wire material so that the same is readily flexible in all directions adapted to be wound upon a cartridge or the like. More particularly, this invention is wire cutting articles constructed from circular, square, and triangular wires to provide at least one cutting edge therealong.

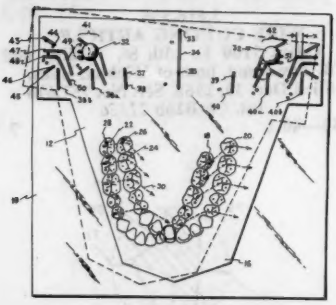
3,616,536
APPARATUS FOR THE CONTINUOUS MANUFACTURE OF CHEESE
Pierre Stenne, Vitry-le-Francois, France, assignor to Paracurd S.A., Geneva, Switzerland
Continuation-in-part of applications Ser. No. 549,669, May 12, 1966, and Ser. No. 833,831, Mar. 28, 1969, the latter being a continuation-in-part of application Ser. No. 439,829, Mar. 15, 1965. This application June 27, 1969, Ser. No. 842,431
Claims priority, application France, May 12, 1965, 1458172
Int. Cl. A01j *25/00*
U.S. Cl. 31—46 **9 Claims**



Apparatus for the continuous manufacture of cheese comprises means for continuously advancing inoculated

condensed milk while rennet and water are successively added thereto, syneresis is completed, and the whey is separated from the curds.

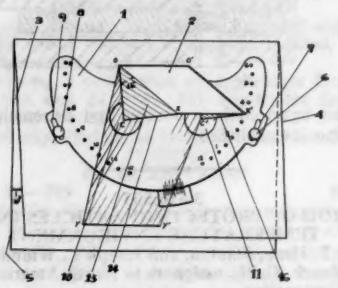
3,616,537
VISUAL AID DEVICE
George E. Schuchard III, 5389 Riverside Drive, Chino, Calif. 91710
Filed Feb. 11, 1970, Ser. No. 10,503
Int. Cl. A61c *19/00*
U.S. Cl. 32—71 **12 Claims**



A device is described which permits the visual demonstration of anatomical movements of the human mandible and the relationship of such movements to the human teeth. The device comprises a pair of plates, one of which bears a view of the mandibular teeth and the other of which bears a view of the maxillary teeth taken along horizontal, sagittal or coronal planes. The location of working and functional cusps are identified on the views and, preferably, at least the upper plate is transparent so that the relative movements of these cusps can be directly observed. The upper plate can also be perforated at the locations of the functional cusps so that a stylus can be inserted to trace the pathways of the cusps on the view of the lower plate. The plates are interconnected by means that permit two dimensional simulation of the anatomical movements and such means can be a plurality of grooves at the right and left sides of one plate with an aperture in the other plate vertically aligned over each groove with a pair of pins, one at each side of the plates, inserted between an aperture and mating groove to link the plates together. Alternative means comprise a dental articulator that permits three dimensional simulation of the anatomical movements.

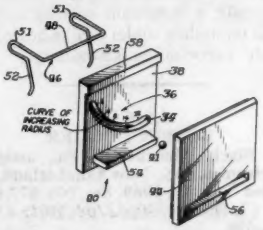
3,616,538
STANDARD TIME SUNDIAL
Tokutaro Yabashi, 265 Akasaka-cho, Ogaki City, Japan
Filed June 19, 1968, Ser. No. 738,334
Claims priority, application Japan, June 19, 1967, 42/52,545
Int. Cl. G04b *49/02*
U.S. Cl. 33—62 **2 Claims**

A sundial comprising a base adapted to be vertically disposed and having an inclined mounting surface, a pivot mounted on such surface and an arcuate dial plate rotatably mounted on the pivot. A style plate is mounted at an angle to the surface and has two parallel shadow casting edges, one for before noon and the other for afternoon, spaced by a selected distance so that the shadow of an edge upon the arcuate dial plate can indicate time. The arcuate dial plate has approximately equally spaced hour-marks graduated on a fixed radius from the pivot. A "location" correction scale is fixed



to the surface adjacent to the edge of the arcurate dial plate. The dial plate has "season" correction reference indicia for selectively setting the dial plate with respect to the "location" correction scale.

3,616,539
RANGE FINDER
Richard K. Carlson, Chicago, Ill., assignor to Bell & Howell Company, Chicago, Ill.
Filed Feb. 3, 1969, Ser. No. 795,810
Int. Cl. G01c *3/00, 9/10*
U.S. Cl. 33—71 **2 Claims**

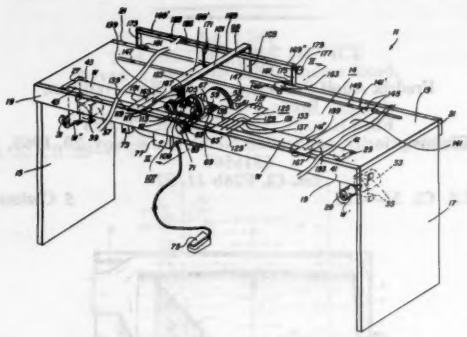


The distance of an optical instrument to a subject is determined according to the principle of triangulation by the position of a gravity orientable ball, in an arcuate track movable with the instrument, and arranged so that at each angle of inclination of its optical axis to a horizontal base, a predetermined track part is closest to the base. A scale of indicia along the track enables read-out of distance according to the position of the ball.

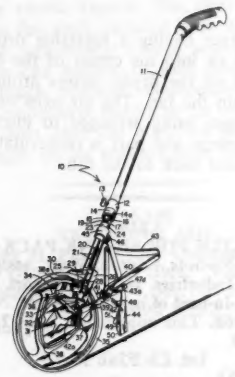
3,616,540
MACHINE FOR SCRIBING A TAPE TEMPLATE
Charles L. Clifton, 1906 W. 34th, Pine Bluff, Ark. 71601
Filed Jan. 2, 1970, Ser. No. 193
Int. Cl. B43l *13/02*
U.S. Cl. 33—76 R **10 Claims**

A machine to be used for scribing a tape template which is used to simplify laying out the framework for wall construction. The machine includes a table-like structure having an electric motor driven platen which carries the tape, to be scribed, across the table, a pair of electric

motor-driven tape take-up reels, a rotary measuring instrument, rough opening indicators which are used in conjunction with a multi-sided locater bar, a center finder template and switches for activating the electric motors.



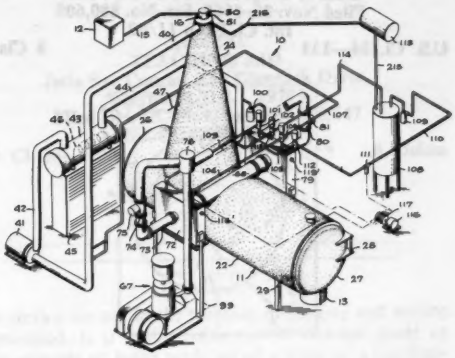
3,616,541
MEASURING WHEEL
Charles A. Crayton, 455 North St., Randolph, Mass. 02368
Filed Jan. 15, 1970, Ser. No. 3,177
Int. Cl. A47j *43/28*
U.S. Cl. 33—141 R **7 Claims**



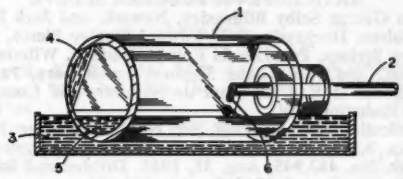
A measuring wheel for measuring and marking off long distances, comprising a wheel, counter and handle. A brake is provided which is operated by pivoting the upper portion of the handle.

3,616,542
APPARATUS AND PROCESSES FOR PRODUCING FREEZE DRIED PRODUCTS
Earl L. Rader, 154 W. Providencia, Burbank, Calif. 91502
Filed Feb. 24, 1969, Ser. No. 801,383
Int. Cl. F26b *5/06*
U.S. Cl. 34—5 **43 Claims**

Freeze drying equipment and methods in which a liquid is sprayed into a refrigerated chamber, maintained under a high vacuum, and is frozen into small preferably snow-like particles or flakes before the liquid can fall onto any surface in the chamber, following which the frozen particles fall downwardly onto a conveyor in the lower portion of the chamber, and are advanced slowly along the conveyor while heat is supplied to the particles in a manner subliming moisture from them.



3,616,543
METHOD OF PRODUCING A MULTICOMPONENT LYOPHILIZED PRODUCT
Eugene S. Barclay, West Chester, Pa., assignor to Merck & Co., Inc., Rahway, N.J.
Filed Oct. 31, 1969, Ser. No. 873,111
Int. Cl. F26b *5/06*
U.S. Cl. 34—5 **6 Claims**

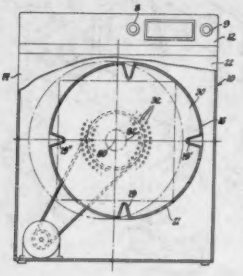


A solution is charged to a container, the solution is frozen, the container is rotated about an axis in such a manner that a second solution introduced to the container does not come in contact with the frozen first solution and then it is frozen. This process is repeated as often as desired or as often as the relative sizes of the container and solution volumes will permit. The frozen masses are then simultaneously lyophilized.

3,616,544
METHOD OF DRYING LUMBER
Aldo Ottolenghi, 25 de Mayo 294, Buenos Aires, Argentina
No Drawing. Filed Sept. 2, 1969, Ser. No. 854,737
Int. Cl. F26b *3/00, 7/00*
U.S. Cl. 34—9.5 **6 Claims**

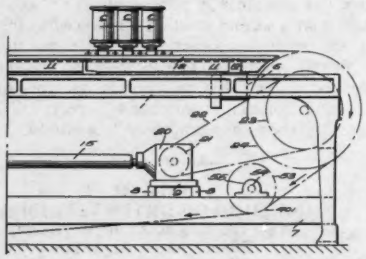
In a lumber-drying method, the lumber is submerged in a bath of water having a temperature of 80° C. or higher. When the lumber has been submerged for a time sufficient for water from the bath to be absorbed and to at least partially replace the original colloidal substances-containing moisture component of the lumber, the latter is removed from the bath and dried by exposure to hot gas, but under exclusion of contact with the ambient atmosphere, until the moisture content of the lumber is reduced to less than about 20% of the original moisture content.

3,616,545
CLOTHES DRYER WITH MEANS TO VARY CENTRIFUGAL FORCES ON THE CLOTHES
James W. Jacobs, Dayton, Ohio, assignor to General Electric Corporation, Detroit, Mich.
Filed Nov. 28, 1969, Ser. No. 880,609
Int. Cl. F26b *11/02*
U.S. Cl. 34—133 6 Claims



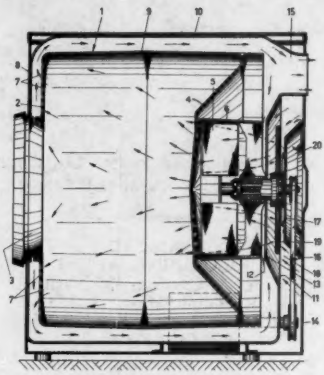
A domestic clothes dryer has a tumbling drum, rotatable about a horizontal axis, in which the center of rotation for the tumbling drum is offset from the geometric center of the tumbling drum. As the tumbling drum rotates, the clothes experience varying amounts of centrifugal force during tumbling thereof to vary their tumbling pattern with respect to a fixed air stream.

3,616,546
APPARATUS FOR PACKAGING GROUPS OF ARTICLES IN A TUBULAR SLEEVE
John George Selby Billingsley, Newark, and Jack Edgar Colsen, Hockessin, Del., Edward Stanley Pierce, Sinking Springs, Pa., Harold Eugene Ramsey, Wilmington, Del., and Paul Glenn Stephan, Landenberg, Pa., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.
Application Nov. 12, 1968, Ser. No. 778,360, now Patent No. 3,513,620, which is a continuation of application Ser. No. 483,945, Aug. 31, 1965. Divided and this application Sept. 5, 1969, Ser. No. 855,675
Int. Cl. B65b *1/02*
U.S. Cl. 34—217 6 Claims



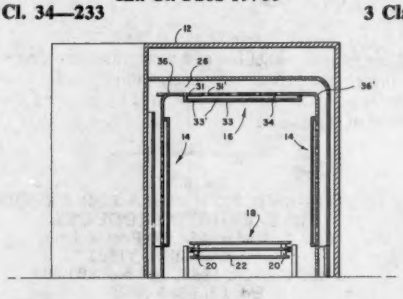
A high speed apparatus and process for continuously automatically packaging groups of articles in a tubular sleeve member, involving continuously conveying a plurality of articles from a first position along a given path to a second position, forming said articles into a series of spaced groups, supplying shrinkable film continuously into operative association with said articles, forming the film into an elongated surrounding envelope around said articles, sealing said film to form a unitary sleeve assembly surrounding said articles, severing said sleeve assembly to form individual groups of articles each enclosed by a tubular sleeve member having open end portions, first shrinking the end portions only of the sleeve member to form at least partial end closures therefrom and then shrinking the entire sleeve member into secure engagement with said articles contained in each sleeve member.

3,616,547
DRYER
Fredrik Adolf Schuurink, 27 Fr. Rooseveltlaan, Breda, Netherlands
Filed Nov. 14, 1969, Ser. No. 877,058
Claims priority, application Netherlands, Nov. 20, 1968, 6816567
Int. Cl. F26b *11/02*
U.S. Cl. 34—133 5 Claims



A laundry dryer having a rotatable drum and a fan to force heated air into the center of the drum. The air enters the back of the dryer, passes around a sheet to a heater and into the fan. The air exits on the opposite side with passages being arranged to discharge part of it to the atmosphere and part is re-circulated by passing through a slit and back to the fan.

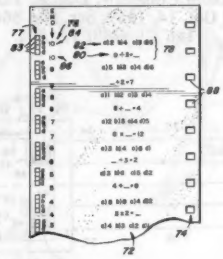
3,616,548
APPARATUS FOR SHRINK PACKAGING
John A. Nichols, Canton, Mass., assignor to Mill Industries, Inc., Shreveport, La.
Continuation-in-part of application Ser. No. 781,440, Dec. 5, 1968. This application June 2, 1970, Ser. No. 42,693
Int. Cl. F26b *19/00*
U.S. Cl. 34—233 3 Claims



A shrink tunnel for heat shrinking wrapping material about articles by introducing heated and pressurized air through spaced perforated discharge members within the

tunnel whereby the air is distributed against at least the top and sides of the heat shrinkable material with substantially equalized volume and velocity to uniformly shrink the material around the articles.

3,616,549
TACHISTOSCOPIC DEVICE
Steven A. Warren, 480 Saunders Road, Lake Forest, Ill. 60045
Filed Dec. 24, 1969, Ser. No. 888,001
Int. Cl. G09b *3/06, 17/04*
U.S. Cl. 35—9 R **4 Claims**



A tachistoscopic device for use with a sheet of symbols to be recognized when momentarily exposed. The device includes a frame having a symbol viewing window, and a shutter is movable past the window to momentarily expose the symbol to be viewed. The sheet of symbols preferably includes a plurality of sets of symbols, each set including a symbol to be viewed, such as a question, and an evaluation symbol to be compared therewith, such as a multiple choice answer. The sheet also includes a marking zone for each question with each zone having a plurality of rectilinearly spaced areas, each area corresponding to one answer of said multiple choice answers. A manually operable rectilinearly movable marking device is mounted in the frame for marking a selected area of the sheet after the questions have been flashed and the multiple choice answers have been exposed.

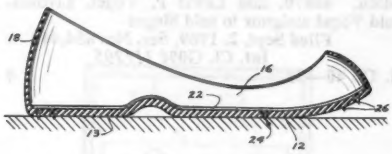
3,616,550
TEACHING AID
Jane M. Pexton, 1509 Carlton Way, Oklahoma City, Okla. 73120
Filed Jan. 8, 1970, Ser. No. 1,374
Int. Cl. G09b *19/02*
U.S. Cl. 35—31 R **7 Claims**

A plurality of insert elements of different lengths representing entry quantities, are inserted into the guide portion of a teaching aid to illustrate a mathematical problem. By moving of an endless tape, on which the inserted elements are supported, to a readout position, indicia on the tape is exposed through an indicator opening representing the solution to the entered problem.

3,616,551
TEACHING AID
Jetta Sue Conrad, 105 Glenrock Drive, Claymont, Del. 19703
Filed Oct. 15, 1969, Ser. No. 866,647
Int. Cl. G09b *17/00*
U.S. Cl. 35—35 J **6 Claims**

A device for use in the teaching of reading and writing is provided. It is a three-dimensional element made up of or capable of being made up of a letter or a combination of letters. These comprise long vowels, vowel variants, short vowels, dipthongs, blends, suffixes, prefixes, digraphs, consonants and the like all of which, as separate elements, are capable of being placed in or on a base which is representative of a line upon which writing is to be placed. The base and the letter-carrying element have co-acting parts which allow the user to place them together in a fixed position. This allows the user to pick up, handle and move about the new combination of letters he has just made. While the parts are three dimensional, the thickness is small, being in the order of that of ordinary paper stock so that the combinations made lie flat much like ordinary written or printed matter.

3,616,552
ANTISKID FOOTWEAR
Alvin R. Kniffin, 2312 10th Ave. E., and Richard B. Haro, 3802 2nd Ave. E., both of Hibbing, Minn. 55746
Filed Sept. 8, 1969, Ser. No. 856,029
Int. Cl. A43b *1/10*
U.S. Cl. 36—7.3 **1 Claim**

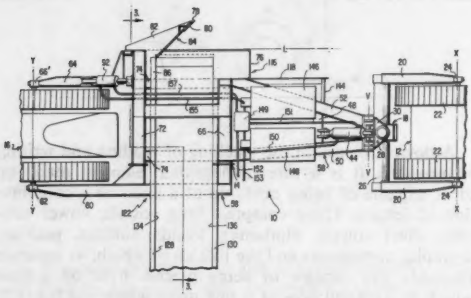


An antiskid footwear including an upper connected to a sole and a spike having a head from which extends a pointed portion, the spike being embedded in the sole with the head substantially centrally transversely of the thickness of the sole and the pointed portion extending outwardly from the bottom surface of the sole.

3,616,553
ELEVATING BELT LOADER AND EXCAVATION APPARATUS
Francis H. Holland, P.O. Box 20223, Billings, Mont. 59102
Continuation-in-part of application Ser. No. 804,045, Feb. 10, 1969. This application May 27, 1970, Ser. No. 40,775
Int. Cl. E02f *5/00*
U.S. Cl. 37—110 **9 Claims**

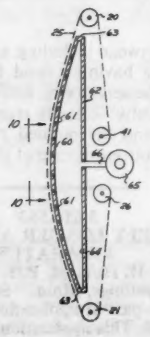
A horizontal platform is devoid of an undercarriage and supports horizontal and vertical excavating blades for depositing excavated earth on an endless conveyor

adapted to discharge the material to one side of the platform. The platform is coupled to a leading prime mover for pivoting about orthagonal axes which pivot axes may be raised and lowered vertically. The rear end of the platform is coupled to the track center of the trailing prime mover by paired arms which in turn pivot about a horizontal axis passing through the mover. Hydraulic means independently raises and lowers the platform about the horizontal axis extending through the trailing prime mover and allows tilting of the platform about a



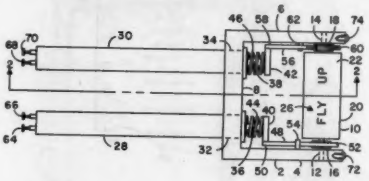
longitudinal axis. The horizontal cutting blade extends upwardly and rearwardly in inclined fashion from a position below the platform to direct excavated earth onto the endless conveyor. The vertical cutting blade lies outboard of and rearwardly of the horizontal blade and is inclined outwardly and forwardly, and a vertical planar fence extends above and along the full inboard edge of the horizontal blade and forwardly beyond the end of the same to insure that the excavated material falling inwardly from the vertical blade lies in the narrow path in front of the horizontal blade.

3,616,554
CHANGEABLE MESSAGE OUTDOOR ADVERTISING SIGN
Karl Singer, 26126 Meadowcrest, Huntington Woods, Mich. 48070, and Lewis P. Vogel, Livonia, Mich.; said Vogel assignor to said Singer
Filed Sept. 2, 1969, Ser. No. 854,449
Int. Cl. G09f *11/295*
U.S. Cl. 40—31 **4 Claims**



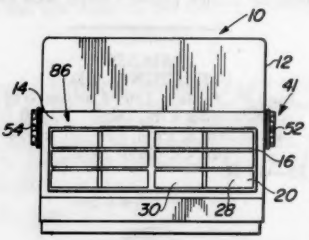
A large outdoor advertising sign having a support surface and a long, advertising message strip arranged in contact with the surface, extending around opposite edges of the surface and wound upon powered rolls at the rear of the surface, so that the strip is first wound around one roll to move along the surface in one direction and then reversely in the opposite direction. One roll is removable for replacing the advertising strip, the other is normally non-removable and has a lead strip fastened thereto for extending around the surface to the other strip where it may be releasably joined to the advertising strip by a conventional zipper. Means is provided for holding the strip upon the surface against wind pressures.

3,616,555
COMPACT ANNUNCIATOR PACKAGE
Melvin L. Campbell, Marion, Iowa, assignor to Collins Radio Company, Dallas, Tex.
Filed Oct. 14, 1969, Ser. No. 866,307
Int. Cl. G09f *11/10*
U.S. Cl. 40—52 **7 Claims**



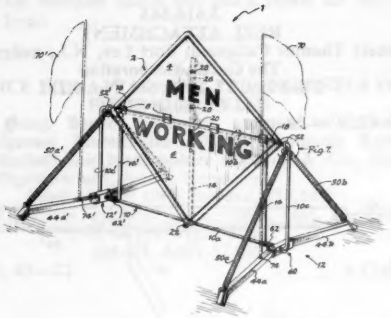
This invention relates to a compact annunciator package comprising a prism mounted for rotation about its axis and formed with a plurality of information-bearing surfaces coated with fluorescent paint, together with solenoid means coupled to the prism and actuable to position the prism to selectively present a desired one of its information-bearing surfaces for display.

3,616,556
MOVABLE DISPLAY
Bernhard O. Williams, Elmhurst, Ill., assignor to Walter E. Heller & Company, Chicago, Ill.
Filed Sept. 4, 1969, Ser. No. 855,244
Int. Cl. G09f *11/14*
U.S. Cl. 40—97 **6 Claims**



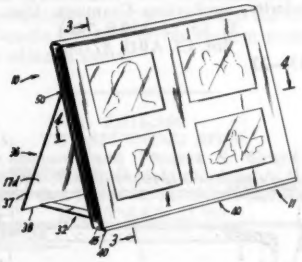
A housing having a window in one vertical wall thereof encloses a series of rectangular display carriers which are pivotally mounted on endless belts. The belts are rotatable, in a track within the housing, about a horizontal axis and are adapted to carry the displays borne by the carriers past the window in sequential order. When the device is employed in a remote control phonograph wall box, each carrier bears a display of record titles on each of its opposing broad faces, and a pair of projecting fingers is positioned adjacent the track at one end of the housing to engage each carrier, in turn, as the belt is rotated, and to cause each carrier to flip over and exhibit its opposing face. On successive rotations of the belt, which is operated by a drive mechanism manually actuated by a customer, first one side of each of the carriers may be viewed through the window, in sequence, and then the opposing side of each carrier is exhibited at the window, also in sequential order.

3,616,557
KNOCK DOWN HIGHWAY SIGN
Arthur G. Vara, Sr., 115 Westview Ave., Hamburg, N.Y. 14075
Filed Nov. 4, 1969, Ser. No. 873,994
Int. Cl. G09f *1/00, 19/02*
U.S. Cl. 40—138 14 Claims



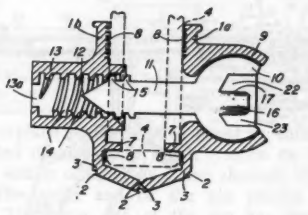
A knock down highway sign adapted to be readily folded from a storage position into an erected position. When erected, the sign is resistant to being tipped over by high wind conditions while being adapted to be swung down into engagement with the ground without substantial injury thereto in the event that the sign is hit and run over by a vehicle.

3,616,558
DEVICE FOR DISPLAY AND SAFE KEEPING OF SNAPSHOTS
Fred L. Jahn, Pittsfield, Mass., assignor to Textron Inc., Providence, R.I.
Filed Aug. 28, 1969, Ser. No. 853,751
Int. Cl. G09f *1/12*
U.S. Cl. 40—152.1 14 Claims



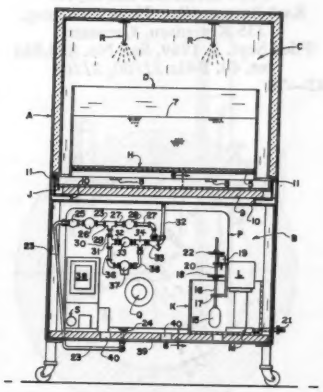
This display device comprises a stand that has hinged foldable leaves with means to support therebetween, a pair of snapshot albums. The leaves are held closed by magnetic means. The front leaf of the stand has window openings through which selected snapshots in the album may be seen. The albums may be easily rearranged to display newly selected snapshots. The snapshot albums, each comprises a plurality of transparent pockets on a binder. The front leaf of the stand has a pair of windows for each album. The albums can be easily placed into the stand with the binder of each holder to the right or left. Each pocket is transparent and can hold two snapshots on each side of a central filler or divider sheet. The pockets are swingable about the binder to bring any desired snapshots to position for exposure through the windows of the front leaf of the stand.

3,616,559
FIREARM TRIGGER LOCK FITTING ON THE TRIGGER GUARD
Edward J. Sobolewski, Moorestown, N.J., deceased, by Helena Sobolewski, spouse of decedent, 159 Haines Drive, Moorestown, N.J. 08057
Filed Sept. 12, 1968, Ser. No. 759,349
Int. Cl. F41c *17/02*
U.S. Cl. 42—1 10 Claims



To prevent a gun trigger surrounded by a trigger guard from being actuated accidentally or by an unauthorized person, a trigger lock of pliable material is bent upon itself around the guard and locked in place by a specially formed key wrench. The lock then prevents access to the trigger so long as it remains in place. However, the lock is so constructed that it can be removed quickly with the aid of the special key wrench.

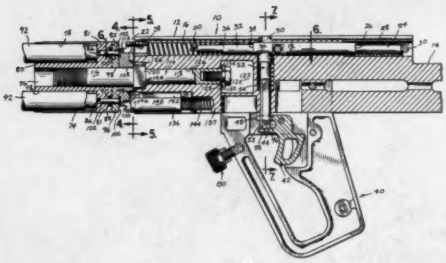
3,616,560
BEAN SPROUT GROWING MACHINE
Henry C. Mun, 162 7th St., Oakland, Calif. 94607
Filed Sept. 12, 1969, Ser. No. 857,413
Int. Cl. A01g *9/02*
U.S. Cl. 47—1.2 3 Claims



A bean sprout growing machine in which automatic means is provided for spraying hot water at a predetermined temperature and at predetermined time periods and for a given length of time for each period to cause beans

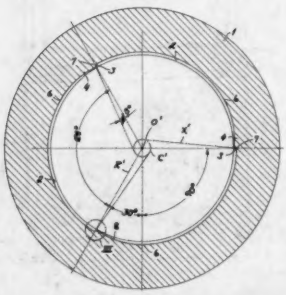
to sprout and grow. Any excess water is immediately drained from the bean sprout growing container and novel means is used for maintaining an unobstructed air passage through the mass of beans from the water drain at the bottom of the container to the top of the compartment so that moist air at a temperature of about 80° F. will constantly fill the container.

3,616,561
MULTIPLE BORE GUN HAVING A ROTATABLE BARREL
Grover E. Hendricks, 2241 Lake St., Niles, Mich. 49120
Filed Mar. 3, 1969, Ser. No. 803,892
Int. Cl. F41c *1/00*
U.S. Cl. 42—1 L **3 Claims**



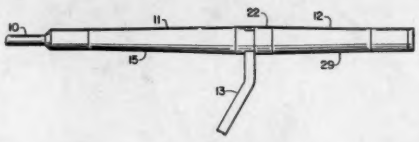
A multiple bore gun having a rotatable barrel member mounted to a gun stock. The barrel member includes a plurality of bores therethrough each equally spaced from the axis of rotation of said bore and having an ammunition cartridge receiving end part which is positionable adjacent to and alignable with a longitudinal bore in the stock upon rotation of the barrel member. A detonating pin is slidably positioned within the stock bore and is shiftable therein between a cocked position and a firing position in which the pin is adapted to engage and detonate an ammunition cartridge seated within an aligned receiving end part.

3,616,562
GUN-BARREL RIFLING
Karl Burgsmüller, Haus Hainberg, 335 Kreiensen, Germany
Filed Sept. 2, 1969, Ser. No. 854,565
Int. Cl. B41c *21/00, 21/04*
U.S. Cl. 42—78 **6 Claims**



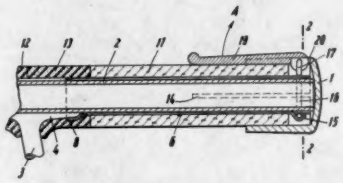
The rifling of a gun barrel consists of three peripherally equispaced shallow helical grooves separated by lands of sawtooth-shaped profile with an apex angle of approximately 90° to define a generally radial guiding edge facing in the direction of twist as viewed when looking toward the muzzle. The bottom of each groove, centered on the barrel axis, extends over an arc of substantially 90° and merges tangentially into the rising flank of the adjoining sawtooth.

3,616,563
REEL ATTACHMENT
Robert Thomas Catignani, Fort Lee, N.J., assignor to The Garcia Corporation
Filed Jan. 27, 1970, Ser. No. 6,231
Int. Cl. A01k *87/06*
U.S. Cl. 43—22 **3 Claims**



A spinning reel is attached to a fishing rod handle, the spinning reel having a stalk terminating in a flat foot having an enlarged end. The fishing rod handle has a rear flange and a smaller diameter extension thereof, said rear flange and said extension containing a vertical opening longer than the width of said enlarged end of said foot. The opening has sides shaped to conform to the profile of said foot so that the stalk, after passing through the opening, may be rotated 90° to seat in the opening, after which locking means is advanced over said extension to clamp said foot in the front end of said opening.

3,616,564
DEVICE FOR ATTACHING FISHING REELS TO FISHING TACKLES
Rudolf Schultz, Berlin, Germany, assignor to Deutsche Angelgerate Manufaktur (DAM) Hellmuth Kuntze Gesellschaft mit beschrankter Haftung & Co., Kommanditgesellschaft, Berlin, Germany
Filed Nov. 5, 1969, Ser. No. 874,257
Claims priority, application Germany, Dec. 10, 1968, G 68 11 310.0–7401
Int. Cl. A01k *87/06*
U.S. Cl. 43—22 **2 Claims**



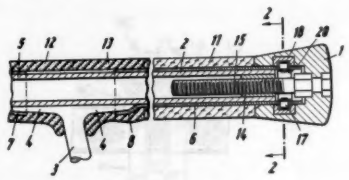
A fishing tackle has a handle carrying the fishing rod. Two sleeves are mounted upon the handle. One of these sleeves is fixed to the handle while the other is slidable thereon. The two sleeves have opposed shoe-like extensions with inclined surfaces adapted to overlap opposite ends of flanges carried by a foot constituting the support of the fishing reel. The sleeves are enclosed by covers of poor heat conducting material. The T-shaped reel support is clamped and held firmly by the two sleeves and their

covers. The movable sleeve has elongated slits extending from its free end and terminating intermediate its ends; a resilient clamping ring encloses this end of the sleeve and has outwardly extending legs engaging inner inclined surfaces of a fork constituting an end of a tensioning lever pivotally secured to the ends of said legs. When the lever is swung, the ring will firmly clamp the sleeve upon the handle. An end cap is connected with the cover enclosing the movable sleeve and has a recess for the tensioning lever.

3,616,565
DEVICE FOR ATTACHING FISHING REELS TO FISHING TACKLES

Rudolf Jung, Berlin, Germany, assignor to Deutsche Angelgerate Manufaktur (DAM) Hellmuth Kuntze Gesellschaft mit beschrankter Haftung & Co., Kommanditgesellschaft, Berlin, Germany

Filed Nov. 5, 1969, Ser. No. 874,247
Claims priority, application Germany, Dec. 10, 1968, G 68 11 311.1–7401
Int. Cl. A01k *87/06*
U.S. Cl. 43—22 **4 Claims**

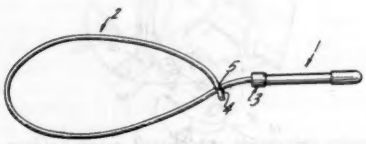


A fishing tackle has a cylindrical handle carrying the fishing rod. Two cylindrical sleeves are mounted upon the handle and at least one of them is movable thereon. The fishing reel has a T-shaped support with opposed flanges which can lie against the handle. The two sleeves have opposed shoe-like extensions with inclined surfaces extending over the edges of the flanges. Each sleeve is enclosed by covers consisting of poorly heat conducting material. A cap mounted upon the end of the handle is used to press the sleeves and their covers against the reel support. The present invention is particularly characterized by a removable connection between the cap and the end of the handle and by a driver element connecting the cap with the adjacent sleeve.

3,616,566
TOY SPINNING ROPE

Marguerite Simpson and Frances S. Grays, both of 137—51 S. Gate St., Springfield Gardens, N.Y. 11413

Filed Oct. 21, 1969, Ser. No. 868,031
Int. Cl. A63h *33/00*
U.S. Cl. 46—51 **5 Claims**

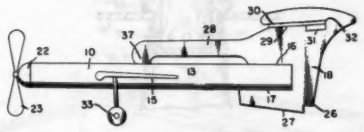


A hand-manipulated lasso having a hollow cylindrical handle and a rotatable shaft within the handle, an elongated plastic-like tubular luminous material having one end thereof connected to the shaft and the other end elastically connected to a point intermediate the shaft end to produce a singular loop, and an orbital type object attached to the loop so that the rotation of loop via the manipulation of handle gives an orbiting effect to the object.

3,616,567
TOY AIRPLANE

Harold Goodman, Newark, N.J., assignor to Goodtone Manufacturing Co., Middletown, N.J.

Filed Aug. 11, 1969, Ser. No. 848,914
Int. Cl. A63h *27/00*
U.S. Cl. 46—78 **4 Claims**

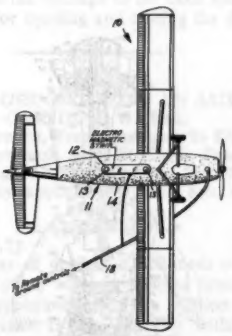


A toy airplane made of hard paper or cardboard has an elongated tubular body which is open on both ends. The front end is covered by a cap through which a pin extends. The outer end of the pin carries the usual propeller. The inner end of the pin has the shape of a hook over which extends one end of a double rubber band serving as the motor. The opposite end of the rubber band fits over a two-headed rivet which extends through the tubular body adjacent the tail. The tubular body has two aligned slots through which the wings extend. The rear end of the tubular body has aligned slots perpendicular to the wing slots through which the rudder extends. An elevator fits into a slit provided in the rudder and is supported by a plastic clip to prevent it from wobbling. Wheels are carried by a support member having angular portions extending over the top surfaces of the wings to prevent the wheels from shifting.

3,616,568
PARACHUTIST DEVICE FOR MODEL AIRPLANES

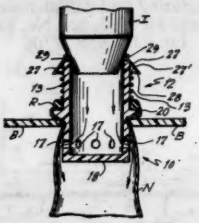
Robert E. Powell, 1114 61st St., Kenosha, Wis. 53140

Filed Mar. 17, 1970, Ser. No. 20,321
Int. Cl. A63h *33/20*
U.S. Cl. 46—86 B **7 Claims**



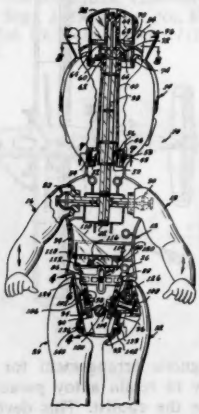
An electro-magnetic arrangement for model aircraft, having the ability to retain a toy parachutist until it is desired to release the chutist. This device is controlled through the use of a remote control cable to the craft from the ground and enables the user to drop the chutist while the craft is in flight in order that it may strike the given target area.

3,616,569
BALLOON AND VALVE ASSEMBLIES AND SUPPLY THEREOF FOR DISPENSING MACHINE
Donald D. Litt, Scarsdale, and David B. Jaroff, New York, N.Y., assignors to Miner Industries, Inc., New York, N.Y.
Filed June 30, 1969, Ser. No. 837,691
Int. Cl. A63h 3/06
U.S. Cl. 46—90 9 Claims



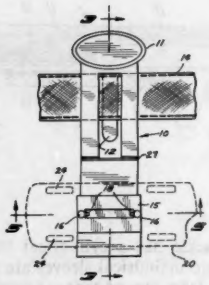
A balloon assembly particularly suited for dispensing by a vending machine has a one-piece valve body elastically engaged by the neck of a balloon to normally seal radial passages opening from an axial bore extending from the outer end of the valve body. The surface of the valve body is given a particular configuration to retain the balloon neck thereon during inflation, and the openings of the radial passages are located to permit such inflation and to retain the inflating gases in the balloon even when comprised of a mixture of air and helium. A plurality of such balloon assemblies are releasably held in the spaced openings of a flexible belt to serve as a supply of balloons for a balloon dispensing or vending machine, with the edge of each belt opening ensuring the retention of the balloon neck on the respective valve during inflation.

3,616,570
ANIMATED DOLL
Sydney L. Groves, Redondo Beach, Joseph Kossoff, Hawthorne, and Joe W. Young, Los Angeles, Calif., assignors to Mattel, Inc., Hawthorne, Calif.
Filed Feb. 12, 1970, Ser. No. 10,838
Int. Cl. A63b 11/00
U.S. Cl. 46—120 8 Claims



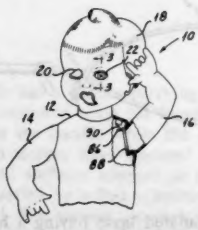
A simple ballerina doll whose legs can pivot together or separately, to perform kicks, toe stepping, and splits, or to assume a sitting position. The doll includes a pair of pivotally mounted legs and an actuator member with a vertical slot that receives a shaft on the doll body, so that the actuator member has opposite ends coupled to a different one of the legs, so that if the actuator member merely pivots, then the legs may move in opposite directions, while if the actuator member is moved down without pivoting, then both legs move up together. A button on the side of the doll enables a child to push the actuator member down or allow it to move up without touching the legs. The doll also has a pivotally mounted knob on its head which a child can hold while turning the doll, and a head spotting mechanism for making the doll face in the same direction for about 90° of each turn.

3,616,571
COMBINATION TOY VEHICLE AND HOLDING MEANS THEREFOR
Cecil F. Adickes, Playa del Rey, Calif., assignor to Tonka Corporation, Mound, Minn.
Filed Feb. 11, 1970, Ser. No. 10,402
Int. Cl. A63h 11/10
U.S. Cl. 46—202 2 Claims



A combination toy vehicle and means for suspending the vehicle from a belt or hat or the like, said vehicle having a pair of apertures on the underside thereof and said means comprising an elongated hanger strap of flexible material having a clip at one end for attachment to the belt and a pair of spaced studs near the other end for insertion one into each of said apertures on the vehicle. The studs have resiliently deformable heads which compress as they pass through the apertures.

3,616,572
BLINKING EYE DOLL
Witold W. Kosicki, Columbia, and Charles M. Hollingsworth, West Columbia, S.C., assignors to Horseman Dolls Inc., Columbia, S.C.
Filed Nov. 18, 1969, Ser. No. 877,789
Int. Cl. A63h 3/40
U.S. Cl. 46—235 19 Claims



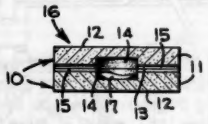
A blinking eye doll in which respective coils are energized to draw permanent magnet slugs into the coils to

drive slidably supported actuators to move pivotally supported eyes from open to closed positions against the action of counterweights. Gravity activated automatic circuitry energizes the coils to provide a periodic rapid blinking action of both eyes when the doll is erect with both arms down and a slower winking action of one eye when the doll is erect and its opposite arm is raised.

ERRATUM

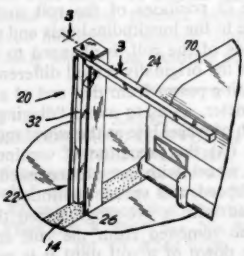
For Class 47—2 See:
Patent No. 3,616,560

3,616,573
SEED CAPSULE
Peter J. Clifford, Fresno, Calif., assignor to FMC Corporation, San Jose, Calif.
Filed Jan. 22, 1969, Ser. No. 793,121
Int. Cl. A01c *1/06*
U.S. Cl. 47—57.6 **1 Claim**



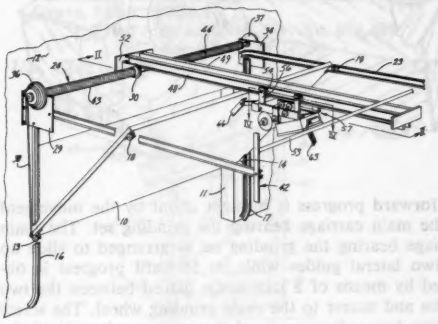
Ventilated seed capsules are formed by preparing a charge of seed bed materials, such as vermiculite and binder, compressing the charge to form a base capsule segment having a cylindrical recess therein with radial grooves extending from the cylindrical recess to the outer perimeter of the base segment, drying the base segment, placing a seed in the recess, and enclosing the recess to form a seed containing cavity by securing to the base a cover that has been prepared in the same manner as the base.

3,616,574
PARKING SPACE BARRIER
Alex Danin, 108 Mamaroneck Ave., White Plains, N.Y. 10603
Filed Jan. 29, 1970, Ser. No. 6,762
Int. Cl. F01f *13/00*
U.S. Cl. 49—35 **7 Claims**



A parking space barrier for preventing unauthorized use of a parking space. The barrier includes a barrier arm which has a blocking position extending at least partly transversely across and over a parking space. The barrier has for this barrier arm a support structure which supports the arm for movement from a non-blocking position hanging down between a pair of adjoining parking spaces first about a substantially horizontal axis in a vertical plane to a blocking elevation and then about a substantially vertical axis in a horizontal plane to its blocking position where the barrier arm is situated at an elevation high enough to clear the hood or trunk of an automobile while still being too low to clear the roof of an automobile.

3,616,575
HIGH-SPEED DOOR OPERATOR
Donald S. Harris, Dallas, Tex., assignor to Overhead Door Corporation, Dallas, Tex.
Filed Oct. 1, 1969, Ser. No. 862,688
Int. Cl. E05f *15/12*
U.S. Cl. 49—200 **11 Claims**

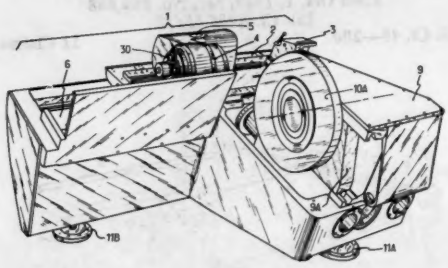


A door operator adapted to move an upwardly acting door along tracks between open and closed positions. The operator includes a carriage mounted upon a substantially horizontal rail extending perpendicularly away from the closed position of the door. An endless chain is arranged in an elongated loop extending along the rail and supported for movement relative thereto. One end of the loop can rotate a shaft mounted above the closed position of the door. Cables are connected between the shaft and the lower edge of the door. Drive means on the carriage engages the chain and causes the carriage to move relative to the chain and the rail. Linkage connects the carriage to the door and cooperates with the cables for opening and closing the door.

3,616,576
EXTERNAL GRINDER WITH AN AUXILIARY GRINDING WHEEL
Jean Piat, La Varenne, France, assignor to Etablissements Piat, Montreuil, Seine-St. Denis, France
Filed Jan. 14, 1969, Ser. No. 790,956
Claims priority, application France, Jan. 16, 1968, 136,274
Int. Cl. B24b *49/14*
U.S. Cl. 51—165.73 **13 Claims**

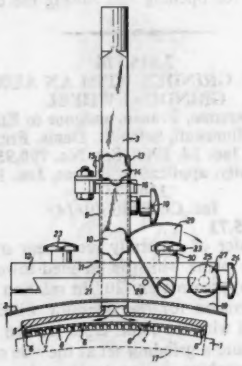
External grinder of generally rectilinear overall shape having an upper plane which is inclined toward the back at an angle of approximately 20° in relation to the horizontal with provision for the operator within the rectilinear shape and with the main table located at the front of the operator and a grinding set at the side of the operator, the whole machine resting on three legs at least one of which is adjustable as to height, the frame of the machine being essentially composed of two water-tight vats forming interlocking caissons filled with a refrigeration liquid arranged for constant circulation. The constituent elements of the machine are tooled perpendicularly among themselves and are provided with an opening and the

added parts are circular, the apparatus being provided with a main grinding wheel with a movable carriage moving perpendicularly to the trajectory of the table holding the part to be ground on a main carriage which is movable perpendicularly to the aforementioned trajectory of the table holding the parts, and an auxiliary grinding wheel having a carriage which moves obliquely with respect to that of the main grinding wheel on the same main carriage, the machine being provided with an electronic control so that as soon as one or the other of the two wheels has selectively reached the position corresponding to the fictitious zero from which a numerical count may begin,



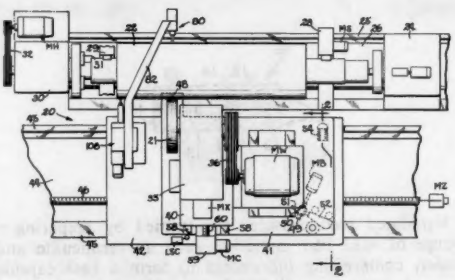
the forward progress is brought about by the movement of the main carriage bearing the grinding set. The main carriage bearing the grinding set is arranged to slide up on two lateral guides while its forward progress is obtained by means of a jack-screw placed between the two guides and nearer to the main grinding wheel. The screw causing forward progress of the main carriage is of the moto-reducer type with electronical numerical counting. The lead screw is associated with a sleeve nut attached to the main carriage through compensating bellows means. The table holding the part to be ground has a fixed tail-block which constitutes the zero reading.

3,616,577
GRINDING APPARATUS
Norman H. Hutton, 85 Wick Hall, Furze Hill, Hove, Sussex, England
Filed Mar. 25, 1970, Ser. No. 22,434
Int. Cl. B24b *55/02*
U.S. Cl. 51—267 **8 Claims**



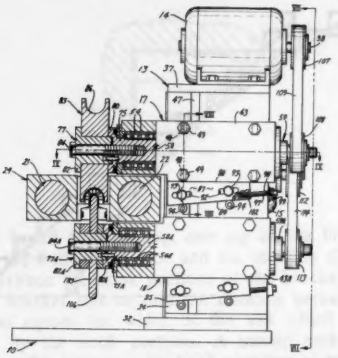
A grinding machine of the kind described in Pat. No. 3,334,451 is modified for use with a grinding element formed with a peripheral grinding edge, by providing the deflector element with a side wall which extends radially in close proximity to the grinding edge and the adjacent side surface of the grinding element and is formed with outlets for directing liquid coolant onto a grinding edge and side surface of the grinding element in directions substantially at right angles thereto so as to effectively remove grinding debris therefrom and is also formed with ridges forming continuations of the ridges on the curved plate of the deflector element for deflecting coolant back onto the grinding edge and adjacent side surface of the grinding element repeatedly without material loss of imparted velocity. The deflector element is also adjustable in an axial direction relative to the grinding element to maintain a constant clearance between the deflector side wall and grinding elements of different widths.

3,616,578
METHOD FOR TURNING WORKPIECES
Stephen C. Clark, Jr., Williamstown, Mass., assignor to The Ingersoll Milling Machine Company, Rockford, Ill.
Filed Jan. 10, 1969, Ser. No. 790,323
Int. Cl. B24b *3/00*
U.S. Cl. 51—326 **17 Claims**



Disclosed here are methods and automatic apparatus for grinding cylindrical workpieces, such as the contoured rolls used in metal rolling mills. The methods and apparatus involve (1) automatic finding of the lengthwise center of rolls of different and undetermined lengths so as to establish a reference position for the execution of a numerically programmed path defined relative to the center of a roll as a point of symmetry, (2) the storage of the successive instructions of multi-axis movements making up a numerically defined profile or contoured path, and the use of those instructions repeatedly and in whole or in part as called for by different ones of a sequence of commands read from storage and executed in succession, (3) the automatic alignment of the roll axis parallel to the longitudinal axis of motion in a grinding machine by pivoting of one end of the roll about the other until the sensed difference in positions of the roll surface, along an axis transverse to the longitudinal axis and at locations near opposite ends of the roll, is changed to a predetermined fraction of the originally sensed difference, (4) the initiation of grinding passes from that end of a roll which is largest in diameter, so as to avoid "digging in" or increasing the depth of wheel bite as the wheel moves lengthwise of the roll, (5) the execution of continuous passes of the grinding wheel with pre-programmed values of feed rate, wheel speed, roll speed, continuous infeed and incremental infeed until a pre-programmed thickness of material has been removed from the roll surface, and (6) the grinding down of a roll until it is reduced to a diameter equal that of a previously ground roll of a matched pair. These functions are all obtained by the calling out and execution of pre-established routines in response to the reading from storage of pre-programmed sequence commands, so that in the disclosed method and apparatus there is an automatic progression from each type of operation to the next, and with the following of numerically defined profile whenever it is required.

3,616,579
GRINDING MACHINE
John A. MacKay, Warren, Mich., assignor to Unison Corporation, Madison Heights, Mich.
Filed Jan. 7, 1970, Ser. No. 1,256
Int. Cl. B24b 7/00
U.S. Cl. 51—82 R 15 Claims



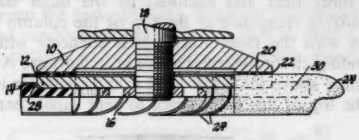
A pair of workpiece-engaging jaws are slideably supported upon guide rods for independent movement lengthwise thereof and said guide rods are supported by pedestals mounted upon a base. The workpiece is channel shaped in this embodiment and opens downwardly when it is held between the jaws. A pair of vertically aligned grinding wheels, one having a convex, peripheral face and the other having a concave, peripheral face are mounted upon spindles for rotation about parallel axes. The wheel spindles are supported in bearing assemblies adjustably mounted upon an upright column connected to the base. A pair of motors are mounted upon the column and connected to the spindles for rotating same independently. The jaws are urged toward and away from each other by hydraulic actuators supported upon the pedestals.

3,616,580
METHOD OF ABRADING TITANIUM AND TITANIUM ALLOYS
Ernest J. Duwell, Hudson, Wis., and In Sun Hong, Roseville, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
No Drawing. Filed Feb. 10, 1969, Ser. No. 798,175
Int. Cl. B24d 5/02, 1/00
U.S. Cl. 51—281 2 Claims

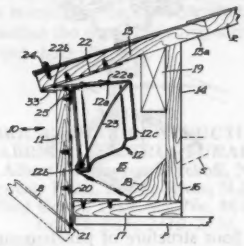
Titaniferous metals are ground more efficiently, more rapidly, and with improved surface finish using a silicon carbide coated abrasive product having a polyvinyl or polyvinylidene halide as a surface coating, e.g., included as a particulate filler in the sandsize adhesive.

3,616,581
POLISHING AND GRINDING ROTARY FINISHING TOOL
Roger W. Johnson, Rochester, Steve M. Senko, Clawson, and Frank J. Sienkiewicz, Warren, Mich., assignors to General Electric Corporation, Detroit, Mich.
Filed Oct. 8, 1969, Ser. No. 864,595
Int. Cl. B24d 9/08
U.S. Cl. 51—337 4 Claims

A nonloading, self-cleaning rotary surface finishing assembly for both grinding and polishing operations using the same abrasive grit. The assembly includes a rigid backup pad and a composite front plate having integral flexible fingers extending radially beyond the backup pad. A plurality of radially arrayed, overlapping, generally tapered flaps, extending out from the fingers, are clamped in place between the backup plate and a rigid central portion on the front plate. The outer periphery and trailing edge of each flap is arcuate, and the trailing edge preferably has a notch near its innermost end for improved wear life.

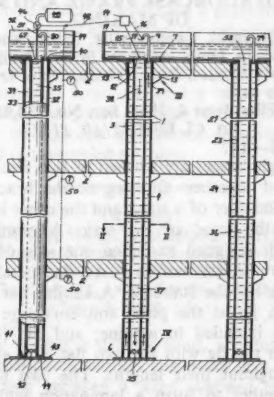


3,616,582
RAIN GUTTER CONSTRUCTION
Gerald E. Walek, 556 E. Nevada St., St. Paul, Minn. 55101, and Arvid A. Olson, 212 Daphne Ave., Cottage Grove, Minn. 55016
Filed Aug. 15, 1969, Ser. No. 850,490
Int. Cl. E04d 13/00
U.S. Cl. 52—15 3 Claims



Rain gutters for a building hinged to swing downwardly and inwardly of the edge of the roof for winter storage behind the facia board which is hinged at its lower edge. An empty space is between the facia board and the ends of the rafters and joists to confine the gutter for storage.

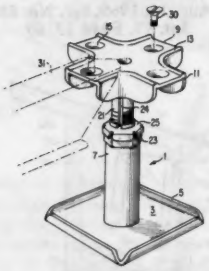
3,616,583
COLUMN ARRANGEMENT FOR MULTISTORY STRUCTURES
Hans Weineck and Gottfried Jacob, Oberhausen, Germany, assignors to Huttenwerk Oberhausen AG, Oberhausen, Germany
Filed June 9, 1969, Ser. No. 831,459
Claims priority, application Germany, June 12, 1969, P 17 59 835.5
Int. Cl. E04b 1/92, 1/74
U.S. Cl. 52—168 6 Claims



A steel-column arrangement for multistory steel structures in which the column is hollow and a coaxial inner

duct is provided for introducing water permanently or upon the development of fire into the chamber surrounding the inner duct and enclosed by the outer column. An equalizing receptacle at the top of the column communicates with the inner duct which connects with the surrounding circumferential space at its bottom. A standpipe opening above the water level in the container is provided at the top of this outer space to vent vapor therefrom.

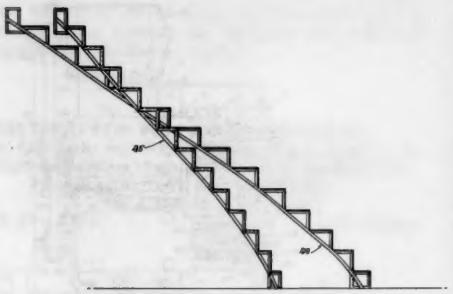
3,616,584
ELEVATED FLOOR ASSEMBLY
R. Gerald Sartori and Eugene L. Swensen, Rockville, Md., assignors to Liskey Aluminum, Inc., Glen Burnie, Md.
Filed Jan. 6, 1970, Ser. No. 931
Int. Cl. E04c *3/32;* **E04d** *15/18*
U.S. Cl. 52—126 **7 Claims**



An elevated floor structure of panels is supportable on pedestals with or without stringers, bridging the pedestals. The pedestals include a base with an upstanding hollow tube and a cap having a depending threaded shaft that slides within the tube. A stop nut with an encapsulating member keyed to the shaft holds the cap and shaft at the desired height while permitting the cap to rotate relative to the base. The cap is cruciform in plan view with four laterally extending arms which support the corners of the panels. The arms each have raised ribs at their longitudinal peripheries with an aperture between the peripheries to receive an insertion. Depending on whether or not stringers are used, the insertion can be fastening, securing or spacer devices that correctly position the pedestals with respect to one another. The raised ribs of the cap interfit with panel or stringer rims.

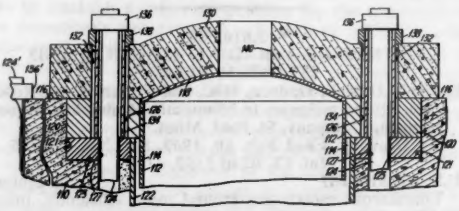
3,616,585
CURVED STAIRCASE FRAME AND METHOD OF MAKING
Adam J. Cirgenski, Lambertville, Mich., and Vernon C. Stiles, Toledo, Ohio, assignors to Stile-King Stairs, Inc., and Scholz Homes, Inc., Toledo, Ohio, fractional part interest to each
Filed June 4, 1968, Ser. No. 734,413
Int. Cl. E04f *11/10, 11/12*
U.S. Cl. 52—187 **3 Claims**

Right-angle braces are formed of two sections of angle iron mitered together. One leg of the brace is adapted to receive the riser of a stair; and the other leg is adapted to receive the tread of the stair. A number of these braces, each designed to define one side of a step in a curved staircase, are mounted on a flat metal bar to form a flat string for the staircase. A similar flat metal bar is placed in a jig at the pitch and curvature the finished staircase is intended to assume; and the formed string is placed in the jig with the two flat bars engaging each other throughout their lengths. The two bars are then welded together to form a lamination while in the jig to provide the curved horse for one side of the staircase with the laminated bars retaining the desired curve and pitch after removal from the jig. Another metal horse is similarly formed for the other side of the staircase, but in a separate jig of different curvature. After the two



curved horses are installed, the treads and risers are attached to a pair of associated braces by screws inserted from beneath the metal frames.

3,616,586
PRESSURE VESSELS
Anthony W. T. Mottram, Rugby, England, assignor to Rolls Royce Limited, Derby, England
Filed July 17, 1969, Ser. No. 842,579
Claims priority, application Great Britain, July 17, 1968, 33,975/68
Int. Cl. E04h *7/20;* **G21c** *13/08*
U.S. Cl. 52—224 **7 Claims**

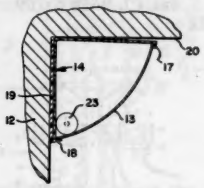


A prestressed pressure vessel having an opening in one of its external surfaces to the interior thereof, the vessel being prestressed by a plurality of prestressing cables extending through the material of the vessel substantially perpendicular to the one surface. At least some of the prestressing cables are utilized for maintaining a removable closure member over the opening, there being means for maintaining at least some of the tension in these cables when the closure member is removed so that they still function to prestress the vessel.

3,616,587
DECORATIVE WIRE MOLDING
Hubert J. Schlafly, Jr., Fort Lee, N.J., assignor to Teleprompter Corporation, New York, N.Y.
Filed Aug. 2, 1967, Ser. No. 657,854
Int. Cl. E04b *19/04*
U.S. Cl. 52—288 **4 Claims**

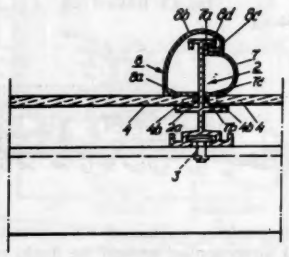
A decorative molding for housing wires, cables and the like and a method for installing the molding on a

building surface are described. The molding comprises a molding slat and at least one bracket adapted to hold the opposite edges of the slat and to mount it on a building surface. In one embodiment the bracket comprises two legs of resilient material, each joined at one end and having a hook portion at the free end. The legs are formed so that the distance between the free ends is less than the distance between the opposite edges of the



slat. To install the molding, one leg of the bracket is fixed to the building surface and the molding slat is inserted between the hook portions of the bracket to distort the bracket legs so that the distance between their free ends equals the width of the slat which is held securely by the hook portions. A second embodiment provides a flat bracket with hook portions at each end, and a flexible slat which is distorted to fit between the hook portions.

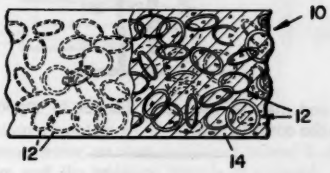
3,616,588
MOLDING FOR USE IN GLAZING GREENHOUSE FRAMES AND THE LIKE
Kurt Ake Valdemar Hansson, Hishult, Sweden
Filed Nov. 25, 1968, Ser. No. 778,552
Claims priority, application Sweden, June 6, 1968, 7,566/68
Int. Cl. E06b *3/60*
U.S. Cl. 52—495 **2 Claims**



A moulding, for use in glazing greenhouse frames and the like, has a strip of resiliently flexible material bent in parallel relation to its longitudinal axis at approximately right angles so as to include one straight leg and one convexly curved leg, and has edge portions bent in directions away from each other respectively for fitting the edge of the pane and for hooking into a structural element of the frame.

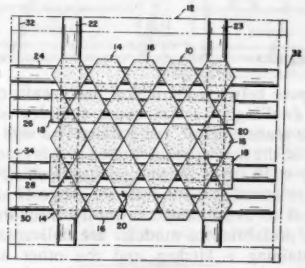
3,616,589
FIBER REINFORCED CONCRETE
James L. Sherard, 70 Hillcrest Road, Berkeley, Calif. 94705
Filed Oct. 31, 1968, Ser. No. 772,343
Int. Cl. E04c *5/01*
U.S. Cl. 52—659 **1 Claim**

A reinforced composite material such as concrete made up of matrix of cementitious material combined with a multiplicity of closely spaced but randomly distributed oriented reinforcing elements. The reinforcing elements are made of high tensile strength wire, rods or bands each in the form of an endless ring or some other closed shape in which there are no free ends so that they cannot slip with respect to the matrix as the result of a failure of bond between the two materials. They are distributed uniformly and randomly throughout the mass in such a way that each portion of reinforced concrete has essentially



the same amount of reinforcing elements by weight. Also, since the inclination of the planes of the individual reinforcing elements are completely random, the composite material has essentially the same structural properties at every point within the mass, including increased compressive, tensile and shear strength.

3,616,590
PREFABRICATED CORE STRUCTURE FOR A PREFABRICATED STRUCTURAL PANEL
Albert Shotmeyer, Wyckoff, N.J. (46 Westerly Road, Saddle River, N.J. 07458)
Filed Oct. 8, 1969, Ser. No. 864,605
Int. Cl. E04c *2/10, 2/36*
U.S. Cl. 52—663 **3 Claims**

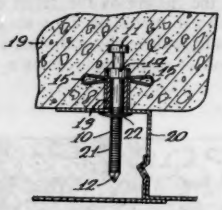


A prefabricated core structure for a prefabricated structural panel made up of a plurality of relatively short, solid, members arranged in side-by-side abutting relation in tiered rows having spaces between the members to form a honeycomb structure, and a series of elongated tubular members disposed at right angles to each other and passing through the honeycomb structure to retain the members in assembled relation.

3,616,591
FASTENER WITH ANCHORING HEAD
Rannalt C. Bahr, 146 Ingalton Ave., West Chicago, Ill. 60185
Filed Nov. 12, 1969, Ser. No. 875,808
Int. Cl. E04b *1/41*
U.S. Cl. 52—701 **2 Claims**

A fastener having a driving head, a pointed end and a radially expandable portion consisting of a plurality of bands extending between a fixed subhead and a collar which is movable toward the subhead to accomplish the expansion of the connecting bands. The expanded head

is received in a mass of concrete pending solidification for securely anchoring the fastener whereby the exposed



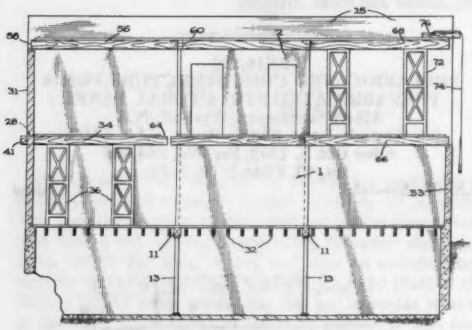
pointed end may be used as a hanger to support accessories to the concrete mass.

3,616,592

METHOD OF CONSTRUCTING BUILDING UNITS

Irving Rothman, 16 Halcyon Court, Baltimore, Md. 21208

Filed Feb. 9, 1970, Ser. No. 9,715
Int. Cl. E04g *21/00;* **E04h** *1/04*
U.S. Cl. 52—745 **22 Claims**



The space between the lateral party walls of a selected existing dwelling of a row-house complex is gutted and the entire space cleared; and a transverse wall defining the rear end of the new or rehabilitated unit is erected between the party walls up to the second story ceiling level. Floor panels are installed on temporary supports at the second floor level so as to extend inwardly from the rear wall; and two prefabricated modules are delivered to the site, one containing a kitchen and the other a completely equipped bathroom, and each extending through a height of one story. The former is conveyed between the party walls to a location adjacent the floor panel, and against one of the party walls approximately midway of its length, and the latter is placed upon the former. The floor panels are then tied to the rear wall and the rear side of the modules, and the remainder of the unit, i.e., floors, walls, partitions, roofing, etc., is then completed around the modules which serve as an inner core.

3,616,593

METHOD FOR PREPARING CHEMILUMINESCENT COMPOSITIONS AND DEVICES CONTAINING TETRAKIS(DISUBSTITUTEDAMINO)ETHYLENES

Sydney Shefler, China Lake, and Harold S. Duff, Ridgecrest, Calif., assignors to the United States of America as represented by the Secretary of the Navy

No Drawing. Filed May 15, 1969, Ser. No. 825,049
Int. Cl. B65b *1/04*
U.S. Cl. 53—37 **3 Claims**

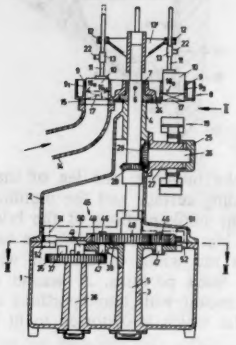
A method for preparing chemiluminescent compositions and devices containing tetrakis(disubstitutedamino)ethylenes, which comprises formulating the composition or filling the device in a normal atmosphere.

3,616,594

MACHINE FOR MOLDING AND WRAPPING BUTTER, MARGARINE, AND OTHER SUBSTANCES OF LIKE CONSISTENCY

Paul Graf, Schaffhausen, Switzerland, assignor to Schweizerische Industrie-Gesellschaft, Neuhausen am Rheinfall, Switzerland

Filed Aug. 28, 1969, Ser. No. 853,650
Claims priority, application Switzerland, Sept. 12, 1968, 13,627/68
Int. Cl. B65b *65/09*
U.S. Cl. 53—122 **8 Claims**



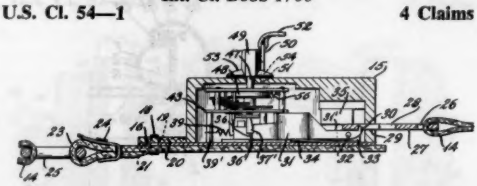
The shafts of the mold and wrapping wheels are at right angles, drivingly connected together by bevel gears, and turned stepwise by a common stepping gear unit consisting of a Maltese-cross transmission and planetary gearing.

3,616,595

AUTOMATIC FLANK STRAP RELEASE

Blue H. Townsend, 2400 N. 49th, Waco, Tex. 76710

Filed Oct. 15, 1969, Ser. No. 866,693
Int. Cl. B68b *1/00*
U.S. Cl. 54—1 **4 Claims**



Flank strap release mechanism for automatically releasing a flank strap applied around the flanks of a horse or other animal, during a rodeo or other performance, to produce pressure and induce bucking of such animal, such release and the relieving of pressure resulting in the animal becoming calmer and consequently capturable. The release mechanism is a spring-actuated clock-type timer, the mainspring of which is adapted to be wound manually and held against unwinding by a release pin with a cord attached and adapted to be withdrawn by a rider of the animal or other person so that the flank strap will be released after the expiration of the time set.

3,616,596

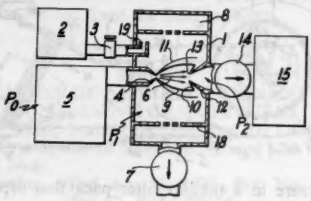
PROCESS AND DEVICE FOR THE SEPARATION OF MOLECULES OF DIFFERENT MASSES

Roger Campargue, Paris, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Feb. 17, 1969, Ser. No. 799,611
Int. Cl. B01d *57/00*
U.S. Cl. 55—17 **8 Claims**

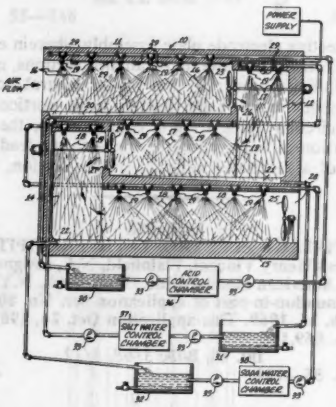
A gaseous mixture containing molecules of different masses which are to be separated is admitted into a cas-

ing at a predetermined pressure through an inlet tube located at a suitable distance from an auxiliary gas inlet nozzle. Said auxiliary gas is admitted into said casing at a supersonic velocity so as to form a jet, the gaseous mixture being extracted along the axis of said auxiliary gas



jet through a discharge duct whose rim is placed downstream of the Mach disc or transverse downstream face of the shock structure produced by said jet. The gaseous mixture which is thus extracted is found to be substantially enriched in light molecules.

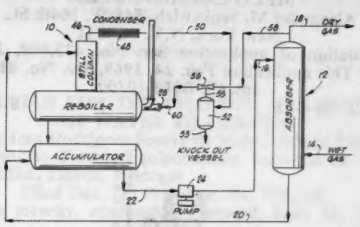
3,616,597
METHOD FOR TREATING AND PURIFYING AIR
Solomon L. Stewart, 4902 W. Bethany Home Road, Glendale, Ariz. 85301
Filed May 11, 1970, Ser. No. 36,072
Int. Cl. B01d *47/06, 53/14*
U.S. Cl. 55—19 **6 Claims**



A method for treating and purifying air by means of a series of different spray treatments resulting in the residue from each spray treatment being delivered to a different sump tank.

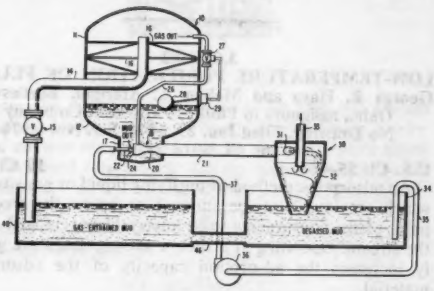
3,616,598
METHOD AND SYSTEM FOR RECONCENTRATING LIQUID ABSORBENT
Adolph J. Foral, Jr., Oklahoma City, Okla., assignor to Black, Sivalls & Bryson, Inc., Kansas City, Mo.
Filed Aug. 14, 1969, Ser. No. 850,096
Int. Cl. B01d *53/14*
U.S. Cl. 55—32 **29 Claims**

The present invention relates to methods and systems for continuously reconcentrating a solution of liquid absorbent and solute. The solution to be reconcentrated is introduced into a reconcentrator having a fuel burner and fire box assembly disposed therein. A stream of fuel is burned in the burner and fire box assembly thereby vaporizing the solute and reconcentrating the liquid absorbent. Prior to burning, the stream of fuel is passed through a jet ejector.



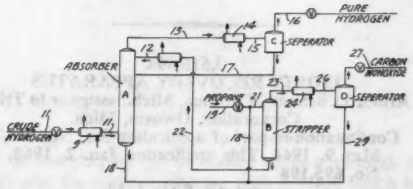
The suction chamber of the jet ejector is connected to the reconcentrator so that vaporized solute is evacuated therefrom and the pressure therein is reduced.

3,616,599
METHOD AND APPARATUS FOR THE DEGASIFICATION OF DRILLING MUDS
Gerald E. Burnham, Sr., Lafayette, La., assignor to Thermotics, Inc., Houston, Tex.
Filed Feb. 19, 1970, Ser. No. 12,543
Int. Cl. B01d *19/00*
U.S. Cl. 55—41 **20 Claims**



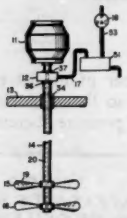
Drilling mud degasification apparatus having baffle plates in a vacuum tank over which thin films of mud are degassed as they flow downward to a receiving area of the tank. Venturi-type dual ejector apparatus is located in a sump in the tank to remove degassed mud and to draw a vacuum on the upper portion of the tank.

3,616,600
GAS PURIFICATION PROCESS
Fred Kurata and George W. Swift, Lawrence, Kans., assignors to The Kansas University Endowment Association, Lawrence, Kans.
Continuation-in-part of application Ser. No. 606,900, Jan. 3, 1967. This application Apr. 4, 1969, Ser. No. 813,676
Int. Cl. B01d *47/06*
U.S. Cl. 55—48 **5 Claims**



Treatment of raw hydrogen to remove low boiling impurities such as carbon monoxide by scrubbing the raw hydrogen with liquefied propane.

3,616,601
OBTAINING AIR FROM WATER BY A MECHANICAL PROCESS
Alexander M. Senkewich, 545 W. 164th St., New York, N.Y. 10032
Continuation of application Ser. No. 423,609, Jan. 5, 1965. This application Feb. 24, 1969, Ser. No. 813,372
Int. Cl. B01d *19/00*
U.S. Cl. 55—52 6 Claims



The extracting of air by means of a pump from air pockets formed in water around the propeller blades.

3,616,602
LOW-TEMPERATURE PURIFICATION OF FLUIDS
George E. Hays and Melvin A. Albright, Bartlesville, Okla., assignors to Phillips Petroleum Company
No Drawing. Filed Jan. 29, 1970, Ser. No. 6,970
Int. Cl. B01d *53/02*
U.S. Cl. 55—66 10 Claims

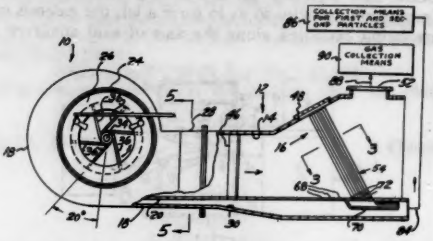
An adsorption method of purifying liquid or gas streams which employs a temperature at or below the freezing point of the constituents to be adsorptively removed from the stream. Operating at or below such temperature greatly increases the adsorption capacity of the adsorptive material.

3,616,603
DECOMPOSABLE FILTER MEANS AND METHOD OF UTILIZATION
John Glenn Warner, Seneca Falls, N.Y., assignor to Sylvania Electric Products Inc.
No Drawing. Filed Nov. 21, 1969, Ser. No. 878,942
Int. Cl. B01d *37/00*
U.S. Cl. 55—97 4 Claims

A decomposable filter utilized in collecting particles of gasborne materials from a moving atmosphere. The filter comprises a formed filter medium of a water soluble organic material having structural stability in an environment having an ambient relative humidity ranging less than 90 percent and an ambient temperature ranging under 100 degrees centigrade. The filter medium is oriented in a holding means in a position to facilitate passage of the moving gas therethrough. The particles retained therein are reclaimed by dissolving the filter in water.

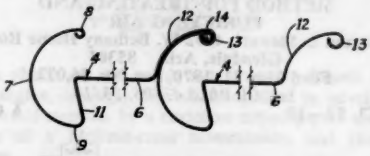
3,616,604
LIQUID RECOVERY APPARATUS
Arthur C. Schouw, Corunna, Mich., assignor to Tri-Mer Corporation, Owosso, Mich.
Continuation-in-part of application Ser. No. 548,729, May 9, 1966. This application Jan. 2, 1968, Ser. No. 695,198
Int. Cl. B03c *3/30*
U.S. Cl. 55—103 8 Claims

Apparatus for recovering compounds from industrial gases by introducing a liquid substance thereto and delivering them to a mixing chamber having a fan for mixing the two substances together. The fan delivers the gas and



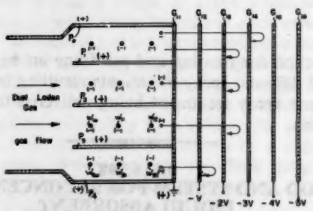
liquid mixture to a tubular filter pack that separates the liquid from the gas.

3,616,605
COLLECTING ELECTRODE PLATE ASSEMBLY
George D. Krause, Somerville, N.J., assignor to American Air Filter Company, Inc., Louisville, Ky.
Filed July 2, 1969, Ser. No. 838,446
Int. Cl. B03c *3/00*
U.S. Cl. 55—130 1 Claim



A collecting electrode plate assembly wherein each collecting electrode is made up of aligned sections, each section including a generally flat planar central body portion, a semicircular baffle leading edge portion, and a quarter circular baffle trailing edge portion, the trailing edge portion of one section nesting with the leading edge portion of a successive adjacent similar section.

3,616,606
MULTISTAGE ELECTROSTATIC PRECIPITATOR
James Henry Vincent, Plainfield, N.J., assignor to American Standard Inc., New York, N.Y.
Continuation-in-part of application Ser. No. 804,050, Feb. 25, 1969. This application Oct. 24, 1969, Ser. No. 869,195
Int. Cl. B03c *3/08, 3/12*
U.S. Cl. 55—131 4 Claims



Covers an electrical precipitator composed of two tandem electrostatic sections arranged to eliminate dust or dirt or any form of particulate matter which may be conveyed with air or gas or any other fluid medium. The first section may include one or more pairs of positively charged vertical plates between each pair of which are positioned a plurality of negatively charged vertical wires, so that a corona discharge may be developed between the vertical wires and the two parallel plates of each pair. The second section, which is contiguous to the

end of the first section, includes a plurality of grids which are parallel to each other, but perpendicular to the plates of the first section. The first grid of the second section may be charged to a positive potential, and the remaining grids are arranged in different charged formations so that particles of matter entering the second section will be urged to turn back so that the particles may be collected and removed from the fluid medium.

3,616,607

SEPARATION OF NITROGEN AND METHANE CONTAINING GAS MIXTURES

Donald L. Klass, Barrington, and Carl D. Landahl, Chicago, Ill., assignors to Northern Natural Gas Company, Omaha, Nebr.

No Drawing. Filed Apr. 6, 1970, Ser. No. 26,129
Int. Cl. B01d *59/10*
U.S. Cl. 55—16 10 Claims

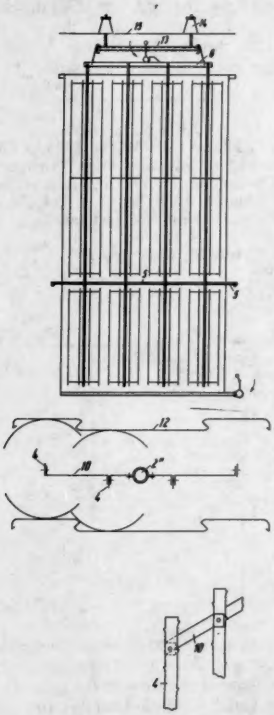
A membrane diffusion process for selectively permeating nitrogen from a methane-nitrogen containing mixture to obtain enriched separated fractions.

3,616,608

DISCHARGE ELECTRODE FOR ELECTROSTATIC DUST COLLECTORS

Walter Steuernagel, Frankfurt am Main, Helmut Gilles, Bergen-Enkheim, Horst-Günter Eishold, Frankfurt am Main, and Theo Wilhelm, Egelsbach, Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Filed July 8, 1969, Ser. No. 839,906
Claims priority, application Austria, July 15, 1968, 6,822/68
Int. Cl. B03c *3/41*
U.S. Cl. 55—148 3 Claims



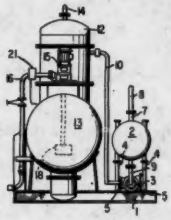
The discharge electrode for an electrostatic dust collector is prefabricated for shipment to the field construction site. It is composed of pairs of spaced electrode strips attached to opposite sides of a mast. Groups of the electrodes can be preassembled into an areal discharge electrode structure.

3,616,609

APPARATUS FOR THE STORAGE AND FEEDING OF WATER TO BOILERS

Adelino Jose Rodrigues Soares de Melo, Lisbon, Portugal, assignor to Termec-Equipamentos Termicos de Coimbra, LDA, Lisbon, Portugal

Filed Dec. 18, 1969, Ser. No. 886,135
Claims priority, application Portugal, Dec. 18, 1968, 50,876
Int. Cl. B01d *19/00*
U.S. Cl. 55—164 14 Claims



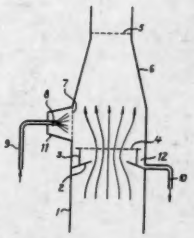
From the description given it results that the present patent application relates to improvements in the assembly of devices for feeding water to boilers bringing about great practical advantages. Among these, the description stresses the possibility of manufacture, assembly and transport of the apparatus as a single block and the facility of automatic regulation of the intake pressure in the manifold of the boiler pumps.

3,616,610

APPARATUS FOR SEPARATING DUST FROM A GAS

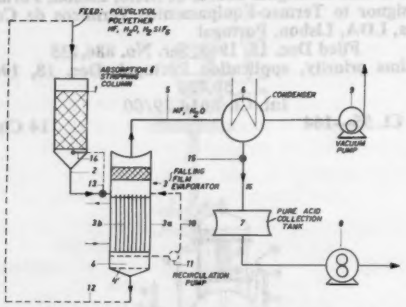
Bronislav S. Javorsky, Huddinge, and Erik A. Gramer, Spanga, Sweden, assignors to Alfa-Laval AB, Tumba, Sweden

Filed Nov. 14, 1968, Ser. No. 775,663
Claims priority, application Sweden, Nov. 16, 1967, 15,724/67
Int. Cl. B01d *19/02, 47/04*
U.S. Cl. 55—178 7 Claims



The dust-containing gas is caused to flow through a channel, and the latter is charged with a foam which is formed substantially independently of the kinetic energy of the flowing gas, the gas being forced to pass through and be filtered by the foam.

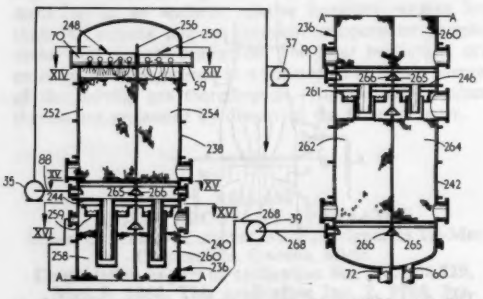
3,616,611
APPARATUS FOR THE CONTINUOUS RECOVERY OF ACIDS FROM INERT ORGANIC MEDIA
Renato Gentili, Muttenz, Switzerland, assignor to Buss AG, Basel, Switzerland
Filed Dec. 13, 1968, Ser. No. 783,553
Claims priority, application Germany, Dec. 22, 1967, P 16 19 843.9
Int. Cl. B01d *3/10, 15/00*
U.S. Cl. 55—165 **2 Claims**



Apparatus for the continuous recovery of pure acids and water-acid mixtures, which are present in contaminated inert organic media such as absorber solutions, comprising:

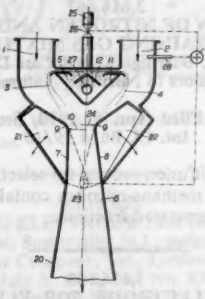
(a) heating means to heat said absorber solutions;
(b) desorption means including a falling-film evaporator operating under vacuum to separate a desorbed acid-water mixture which has much higher HF strength than the azeotrope;
(c) means for withdrawing the desorbed water-acid mixture in the vapor phase from said falling-film evaporator;
(d) condensing means to liquefy said desorbed water-acid mixture; and
(e) pumping means and recycling means to transport the absorbent from the evaporator to an absorption tower for re-use.

3,616,612
DESALINATION
Allan Martindale, Bramhall, Bryan R. Parr, Sale, and Michael J. S. Smith, Abingdon, England, assignors to Simon-Carves Limited, Cheshire, England
Continuation of application Ser. No. 697,803, Jan. 15, 1968. This application Jan. 16, 1970, Ser. No. 3,549
Claims priority, application Great Britain, Jan. 17, 1967, 2,348/67
Int. Cl. B01d *19/00*
U.S. Cl. 55—193 **3 Claims**



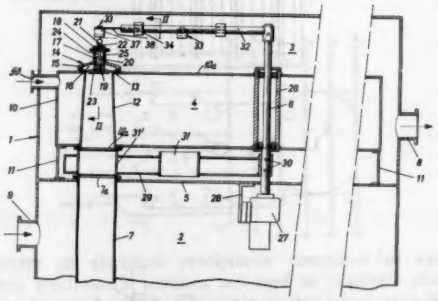
In a desalination plant, small quantities of refrigerant are stripped from the fresh and saline waters by subjecting the water to different degrees of vacuum and then, preferably to stream of air.

3,616,613
VENTURI APPARATUS FOR SCRUBBING GAS
Heinz Loquenz and Horst Weber, Vienna, and Helmut Pfisterer, Kritzendorf, near Vienna, Austria, assignors to Waagner-Biro AG, Vienna, Austria
Filed Sept. 5, 1968, Ser. No. 757,545
Claims priority, application Austria, Sept. 14, 1967, A 8,422/67
Int. Cl. B01d *47/10*
U.S. Cl. 55—227 **10 Claims**



An apparatus for scrubbing a gas such as a crude gas laden with dust particles which are to be removed from the gas stream. The gas which is to be cleaned is directed along the interior of a Venturi, first through a converging portion, then through the throat, and then through the diverging portion or diffusor of the Venturi. Upstream of the Venturi throat a liquid-supply means is located for situating in the path of gas flow a screen of washing liquid which falls by gravity across the gas stream so that the latter by its kinetic energy will break up the screen of washing liquid into fine and very fine droplets which become uniformly distributed across the gas stream to flow with the latter through the Venturi throat and then along the diffusor portion of the Venturi.

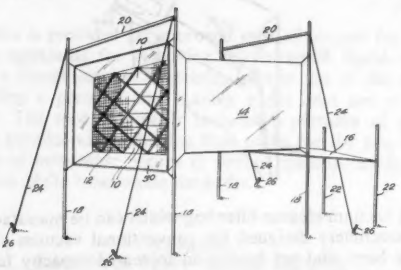
3,616,614
PNEUMATIC DUST REMOVAL MACHINE
Edwin B. Eisenegger, Bronschhofen, Switzerland, assignor to Gebruder Buhler AG, St. Gall, Switzerland
Filed June 18, 1969, Ser. No. 834,434
Claims priority, application Switzerland, June 20, 1968, 9,204/68
Int. Cl. B01d *46/04*
U.S. Cl. 55—294 **7 Claims**



A pneumatic dust removal machine includes a dusty air chamber having a plurality of filter hoses having exterior sides which communicate with the dusty air chamber and an interior which communicates at one end with a clean air chamber. A rinsing air chamber is mounted within the clean air chamber and it carries a blow nozzle having one end of which is aligned with the end of the filter

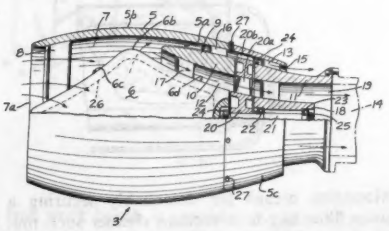
hose communicating with the clean air chamber. The rinsing air chamber is spaced away from the dusty air chamber and in the space therebetween there is moveable an arm member which carries a connecting tube which may be aligned with the blow nozzle and the filter hose. The arm member is moved in conjunction with an actuating member which opens a valve disposed between a connection of the blow nozzle at its opposite end to the rinsing air chamber. As the valves of each hose are actuated the connecting tube will be aligned between the blow nozzle and the filter hose to permit the rinsing air to move through the blow nozzle and the connecting tube into the filter hose. Subsequently, the valve is closed and a connecting tube moved out of alignment between the blow nozzle and the filter hose to continue the communication of the interior of the filter hose to the clean air chamber which discharges through an outlet.

3,616,615
COLLOIDAL DROPLET COLLECTOR
Robert L. Woodbury, Darlington, Md., assignor to the United States of America as represented by the Secretary of the Army
Filed Sept. 11, 1969, Ser. No. 857,076
Int. Cl. B01d *46/00*
U.S. Cl. 55—278 **3 Claims**



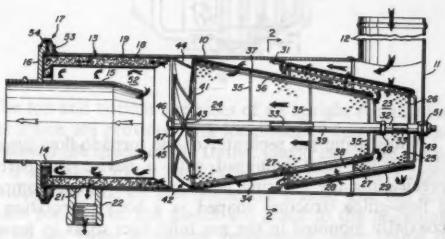
An apparatus for the direct interception of liquid water from clouds comprising an array of open end ducts in juxtaposition, a grid positioned in front of the array, and collecting means positioned at the bottom of the array.

3,616,616
PARTICLE SEPARATOR, ESPECIALLY FOR USE IN CONNECTION WITH JET ENGINES
Joseph Flatt, Dayton, Ohio, assignor to Tech Development, Inc., Dayton, Ohio
Filed Mar. 11, 1968, Ser. No. 712,190
Int. Cl. B01d *45/12*
U.S. Cl. 55—306 **11 Claims**



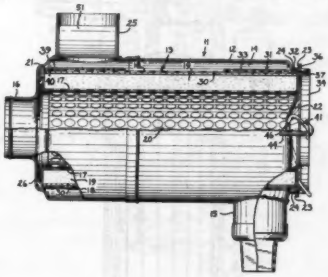
A particle separator, especially for use in connection with a gas turbine, which comprises cowl means having an inlet end and outlet end and together with a deflector body arranged within said cowl means in spaced relationship thereto forms passage means extending from said inlet means to said outlet means while the outer contour of said deflector body ascends from said inlet end to a hump on the deflector body between said inlet and outlet ends, that portion of said passage means which is located between the outlet end of said cowl means and the said hump being divided into an outer passage for discharging separated particle means to the atmosphere and to an inner passage for discharging air to a turbine engine to which the deflector is connected.

3,616,617
LIQUID SEPARATOR
Raymond S. De Groote, Centerville, Ohio, assignor to United Aircraft Products, Inc., Dayton, Ohio
Filed Jan. 13, 1969, Ser. No. 790,697
Int. Cl. B01d *50/00*
U.S. Cl. 55—307 **12 Claims**



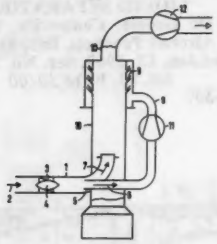
A liquid separator in which nested, frusto-conical coalescer elements provide a large surface area for contact with a moisture holding flowing air, the elements between them defining a continuously open, relatively restricted fluid by-pass. Downstream of the coalescer elements means collects and drains formed liquid droplets while the dried air discharges separately.

3,616,618
AIR FILTER GASKET ELEMENT
Donald D. Gronholz and Delmer L. Radeztsky, Minneapolis, Minn., assignors to Donaldson Company, Inc., Minneapolis, Minn.
Filed Aug. 13, 1969, Ser. No. 849,727
Int. Cl. B01d *50/00*
U.S. Cl. 55—337 **14 Claims**



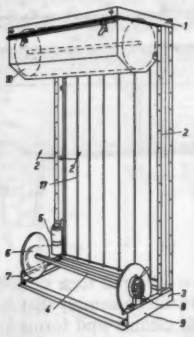
The disclosure is directed to a centrifugal air cleaner having a removable filter assembly that fits within an outer container of the air cleaner and forms air passages therewith. Forming part of the air filter assembly is a resilient gasket casing which encircles a part of the assembly to provide (a) air sealing function between the assembly and the outer container; (b) an inwardly extending baffle to prevent centrifugally collected dust from entering the air filter; and (c) a handle extending outwardly from the air cleaner to facilitate removal of the air filter assembly for inspection and cleaning.

3,616,619
TORNADO-FLOW SEPARATOR WITH RAW-GAS PRECLEANSER
Heinrich Klein, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany
Continuation of application Ser. No. 743,514, July 9, 1968. This application Nov. 19, 1969, Ser. No. 871,693
Claims priority, application Germany, Sept. 27, 1967, S 112,044
Int. Cl. B01d *45/12*
U.S. Cl. 55—338 **2 Claims**



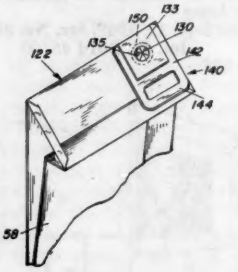
A dust-from-gas separator of the tornado-flow type has its row-gas inlet equipped with a device for partially precleaning the entering gas flow. The device comprises a flow-guide structure shaped as a body of rotation and coaxially mounted in the gas inlet duct so as to leave an annular interstice in which a coaxial group of guide vanes provides a helically twisting path for the gas flow. An axial tube of smaller diameter than the gas inlet duct has its inlet opening situated behind the vanes and receives the precleaned partial current of gas which flows near the axis of the duct, whereas the more heavily dust-laden outer portion of the gas flow enters into the tornado-flow separator vessel proper.

3,616,620
AUTOMATIC ROLLER BAND FILTER
Gerhard Max Neumann, Berlin-Dahlem, Germany, assignor to Delbag Luftfilter G.m.b.H., Berlin, Germany
Filed Dec. 30, 1968, Ser. No. 787,692
Claims priority, application Germany, Dec. 30, 1967, D 37,221
Int. Cl. B01d *46/18*
U.S. Cl. 55—354 **3 Claims**



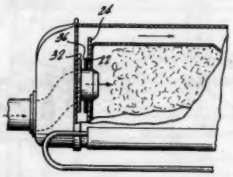
In automatic roller band filter assemblies of the type in which a filter band wound on a freely-rotatable bobbin in an upper portion is pulled down through a filtering intermediate portion by a driven bobbin mounted in a lower portion, a problem exists in ensuring that an adequate seal is provided at the edges of the filter band during its downward travel through the intermediate zone. This is provided according to the invention by the provision of girder-shaped members extending from the upper to the lower portions in association with a right-angled pressure plate mounted on the said girder member whereby a sealing surface of the said sealing member may be moved onto the filter band passing over the said girder-shaped members. In a particular embodiment of the invention the said girder-shaped members are hat-shaped members, and the right-angled sealing members are mounted to engage in slots in the girder members to allow the said movement to and from a sealing position.

3,616,621
VACUUM CLEANER FILTER BAG
John J. Fesco, 1100 Steele Blvd., Baldwin, N.Y. 11510
Filed Apr. 14, 1969, Ser. No. 815,905
Int. Cl. B01d *46/02*
U.S. Cl. 55—367 **10 Claims**



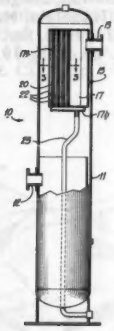
A vacuum cleaner filter bag which can be manufactured on machinery designed for conventional vacuum cleaner filter bags, and yet having an increased capacity for dirt and dust, by the provision of off-center access means associated therewith.

3,616,622
MOUNTING MEANS FOR VACUUM CLEANER BAGS
Abraham Friedman, Brooklyn, N.Y., assignor to Studley Paper Company, Inc., Far Rockaway, N.Y.
Continuation-in-part of abandoned application Ser. No. 555,546, June 6, 1966. This application May 16, 1969, Ser. No. 830,910
Int. Cl. B01d *46/02*
U.S. Cl. 55—376 **21 Claims**



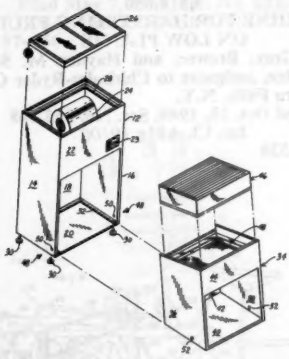
Mounting means for detachably securing a vacuum cleaner filter bag to a vacuum cleaner such that the inlet to the bag is in fixed registry with the inlet from the vacuum cleaner itself, the novel vacuum cleaner bag itself and a combination of a vacuum cleaner and a vacuum cleaner bag wherein either the vacuum cleaner or the bag is provided with a magnet and the other is provided with a magnetically-susceptible member each of which encircle the inlet to said bag or said vacuum cleaner.

3,616,623
MIST ELIMINATOR
Laurance S. Reid, 610 Broad Lane, Norman, Okla. 73069
Continuation-in-part of application Ser. No. 596,389, Nov. 15, 1966, which is a continuation-in-part of application Ser. No. 377,273, June 23, 1964. This application Jan. 19, 1970, Ser. No. 3,988
Int. Cl. B01d *45/08*
U.S. Cl. 55—440 1 Claim



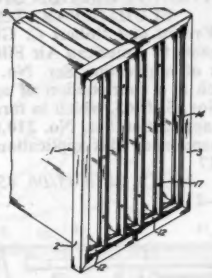
There is provided an improved mist eliminator for use in an apparatus for removing an entrained liquid mist from a liquid particle containing carrier gas of the type including a pressure shell having a gas inlet and a gas outlet. The mist eliminator includes a plurality of generally parallel vanes defining flow paths for the gas, and baffles of permeable porous or fibrous material cover the surfaces of the vanes along the paths.

3,616,624
LAMINAR FLOW WORK BENCH
Robert Claude Marsh, Albuquerque, N. Mex., assignor to Becton, Dickinson and Company, East Rutherford, N.J.
Filed Nov. 4, 1969, Ser. No. 874,009
Int. Cl. B01d *46/02*
U.S. Cl. 55—472 4 Claims



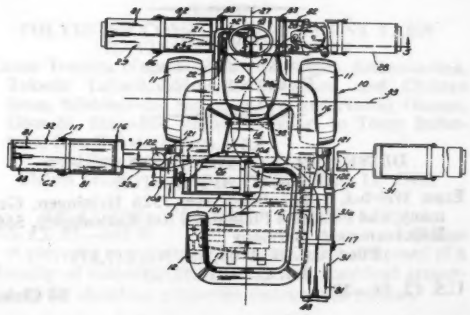
A dust free work bench is provided comprising a cabinet containing a blower and prefilter and having an opening to receive a work area enclosure and a removable work area enclosure including a high efficiency particulate air filter. The HEPA filter is presealed to the work area so that leakage can be tolerated between the cabinet and enclosure without resulting in contamination of the air flow within the enclosure.

3,616,625
AIR FILTER CONTAINING FILTER BAGS
Harry N. Cotabish, Allison Park, Frank W. Smith, Fox Chapel, and Wayne L. Smith, Bradford Woods, Pa., assignors to Mine Safety Appliances Company, Pittsburgh, Pa.
Filed Mar. 4, 1970, Ser. No. 16,481
Int. Cl. B01d *46/02*
U.S. Cl. 55—483 3 Claims



The top and bottom and sides of an upright rectangular outer frame are provided with longitudinal channels opening toward the inside of the frame. Glued into these channels is a gasket. Filter bags behind the frame have open ends disposed side by side inside the frame. The top and bottom portions of the gasket are glued to the adjoining ends of the bags. A narrow rectangular inner frame is inserted in the open end of each bag with its top and bottom held in the top and bottom channels. A U-shape clamping strip is disposed in each side channel and straddles the outer sides of the adjoining bag and inner frame to clamp them together. The outer side of each clamping strip is glued to the adjoining side portion of the gasket.

3,616,626
MOWER
Robert K. Bramley, Cleveland, and Hugh A. Bourassa, University Heights, Ohio, assignors to Hahn, Inc., Evansville, Ind.
Filed Feb. 14, 1968, Ser. No. 705,395
Int. Cl. A01d *75/30*
U.S. Cl. 56—7 5 Claims



A power mower including five reel-type mower units mounted on a motor driven vehicle. The forward vehicle wheels are driven and the rearward wheels are steerable. The operator's seat is at the front of the vehicle. Two forward reel mower units are mounted with one on each side of the vehicle positioned to overlap a center reel unit mounted behind the drive wheels at the center of the vehicle. Two outboard reel units are mounted with one on each side of the vehicle in substantial alignment with the center unit. Each of the reels is driven by the vehicle mounted engine through a flexible cable drive including an automatic overload slip clutch. Each of the mower

units is provided with a power retraction unit for moving the units toward the retracted position from the operative position. Counterbalancing is provided in the retraction units to support a substantial portion of the weight of each unit. The mowers are free floating and can raise and lower as well as tip to follow the ground contour.

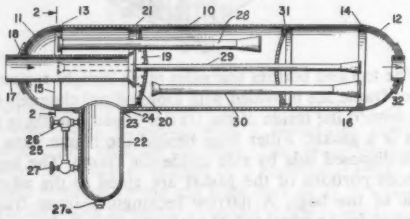
3,616,627
COMBINATION PULSATION DAMPENER AND FLUID SEPARATOR

Wilhelm S. Everett and Robert C. Glover, Santa Paula, Calif., assignors to American Air Filter Company, Inc.

Continuation of application Ser. No. 606,461, Dec. 30, 1966, which is a continuation of application Ser. No. 516,816, Nov. 5, 1965, which in turn is a continuation-in-part of application Ser. No. 210,683, July 18, 1962, all now abandoned. This application Apr. 1, 1968, Ser. No. 718,017

Int. Cl. B01d *45/06, 45/08*

U.S. Cl. 55—274 **3 Claims**



A combination pulsation dampener and fluid separator is provided wherein particles of fluid entrained in a gaseous flow are separated out in the inlet chamber portion of the pulsation dampener. Towards this end the fluid and gas mixture inlet to the dampener terminates at a distance less than one diameter of the inlet pipe from a wall or partition portion of the inlet chamber. This wall or partition portion may be provided with protuberances against which the fluid impinges. The outlet from the inlet chamber to a further chamber in the pulsation dampener is disposed in a pipe so that reverse flow is necessary over a given distance during which time separation takes place. A suitable drain is disposed from the inlet chamber to collect the separated fluid or other particles.

ERRATUM

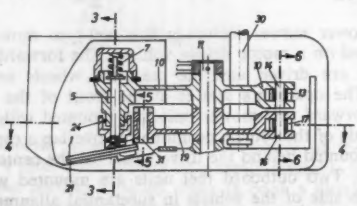
For Class 56—7 see:
Patent No. 3,616,626

3,616,628
DRIVE ARRANGEMENT FOR REAPER CUTTING APPARATUS

Ernst Weichel, 1 Bahnhofstrasse, 7326 Heiningen, Germany, and Friedrich Philipp, 26 Am Kattenbusch, 5608 Radevormwald, Germany

Filed Apr. 21, 1969, Ser. No. 817,879
Int. Cl. A01d *55/02*

U.S. Cl. 56—297 **14 Claims**



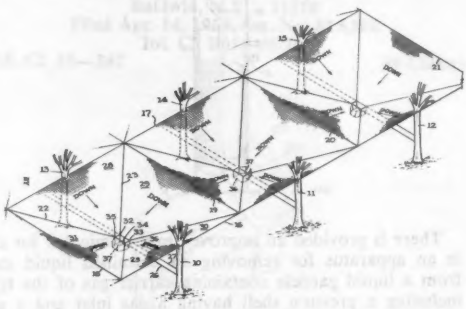
In a reaper apparatus employing one or a pair of moving blades, a drive lever is secured to each moving blade and is mounted to pivot about a vertical axis for imparting a reciprocating action to the blade. Pin connections, in parallel relationship with the axis of the pivot for the lever, secure the lever to the blade and to drive means. The upper blade is resiliently held against the lower blade during operation.

3,616,629
NUT AND FRUIT HARVESTING SYSTEM

Hiroshi Ooka, Hilo, Hawaii, assignor to Castle & Cooke, Inc., Honolulu, Hawaii

Filed Feb. 13, 1970, Ser. No. 11,229
Int. Cl. A01g *19/06*

U.S. Cl. 56—329 **7 Claims**



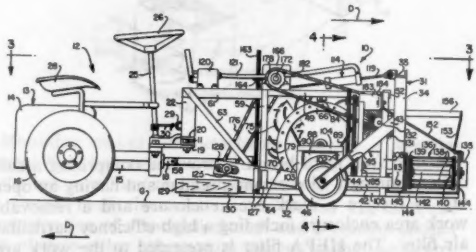
Nuts and fruit growing on trees planted in rows are harvested by nets mounted on parallel wires extending down the rows of trees. The wires are secured to the trees at heights to allow vehicles to pass thereunder. Net panels slope downwardly toward a point between opposite trees of adjacent rows of trees. A net catchment container is located at the low point of the net panels and receives nuts or fruit dropping from the trees. When full, the container is tipped to discharge its collected contents.

3,616,630
MACHINE FOR HARVESTING FRUIT ON LOW PLANTS

Gleason L. Gray, Brewer, and Hayden M. Soule, Jr., Orono, Maine, assignors to Chisholm-Ryder Company, Inc., Niagara Falls, N.Y.

Filed Oct. 10, 1969, Ser. No. 865,448
Int. Cl. A01g *19/00*

U.S. Cl. 56—330 **4 Claims**



A mechanical harvester is disclosed which picks fruit from relatively low plants such as lowbush blueberries,

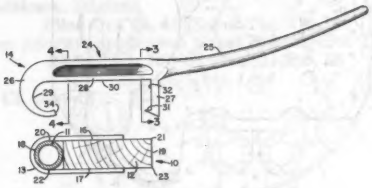
the picker being movable over the plants and comprising rows of laterally spaced tines or teeth which descend successively into the plants and move rearwardly therethrough and thence upwardly to comb or rake the fruit from the plants, carrying the fruit upwardly and dumping it so that it can be conveyed to a suitable collection location.

3,616,631

SNAP-ON TOOTH FOR AGRICULTURAL EQUIPMENT

Henry A. Quam, Edmonton, Alberta, Canada, assignor to Imperial Oil Limited, Toronto, Ontario, Canada

Filed Jan. 12, 1970, Ser. No. 2,209
Int. Cl. A01d *7/00*
U.S. Cl. 56—400 **2 Claims**



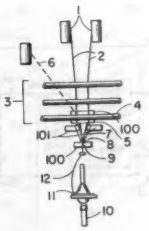
A snap-on tooth for an agricultural implement wherein the tooth includes a mounting base and a tine extending from the base. The base clamps to a tooth supporting bar in a snap-on manner. The hooks or other clamping elements of the base are resiliently yieldable to permit snap-on attachment at any longitudinal location along the bar.

3,616,632

METHOD OF AND APPARATUS FOR SPINNING, DOUBLING AND THREADING STAPLE FIBERS AND/OR SILK

Kurt Helmar Reuter, Oederan, Maria Elisabeth Steinhauser and Horst Sacher, Karl-Marx-Stadt, and Karl Heinz Silbermann, Mittweida, Germany, assignors to Vereinigung Volkseigener Betriebebaumwolle Wissenschaftlich-Technisches Zentrum Baumwollspinnerei und Zwirnerei, Karl-Marx-Stadt, Germany

Filed May 7, 1969, Ser. No. 822,471
Int. Cl. D01h *5/28*
U.S. Cl. 57—36 **23 Claims**



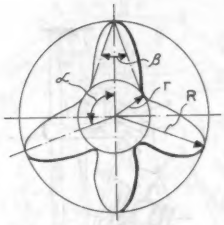
A method of and apparatus for spinning, doubling and twisting staple fibers and/or silks, wherein the complete dissolution of false twist is prevented by so-called "fixing" while simultaneously imparting genuine twist upon the fibers or silks by supplying the refined fiber band from the drafting device to a rotating tubular member, or to a rotating tubular member and subsequently to a thread guiding element, or directly to a thread guiding element.

3,616,633

TETRALOBAL SYNTHETIC FILAMENT, PROCESS FOR PRODUCING THE SAME, AND ARTICLE MADE THEREFROM

Genevieve Chevalier-Seyvet, Romans, and Jean Joly, Brindas, France, assignors to Societe Rhodiaceta, Lyon, France

Filed June 12, 1970, Ser. No. 45,836
Claims priority, application France, June 13, 1969, 6919786
Int. Cl. D02g *3/02*
U.S. Cl. 57—140 J **10 Claims**



A novel synthetic filament and articles produced therefrom wherein said filament has a tetralobal configuration, the filament and article produced therefrom possessing improved characteristics of rigidity and good covering power. Such filaments are characterized in that the ratio of the radius of the inscribed circle, i.e., the circle which passes through the connecting point of the lobes, to the radius of the circumscribed circle, i.e., the circle which passes by the apex of the lobes, is within the range of 0.25 and 0.42. The tetralobal configuration is further characterized in that two adjacent angles formed by the axes of the lobes are between greater than 90° to 120°.

The tetralobal synthetic filaments are prepared by extruding a thermoplastic polymer in a molten condition through a spinneret, the apertures of which are composed of four slits of substantially equal length forming a cross of two adjacent angles of between greater than 90° to 120°, the filaments being thereafter passed through a gaseous atmosphere and through a cooling bath maintained at a temperature lower than 100° C.

3,616,634

POLYESTER COMPOSITE FILAMENT YARN HAVING STABLE CRIMPS

Kazuo Tomiita, Nagaizumi-cho, Sunta-gun, Shizuoka-ken, Takeshi Takase, Mototada Fukuhara, and Chikara Sano, Mishima-shi, Shizuoka-ken, and Nobuo Ohmae, Otsu-shi, Shiga-ken, Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed June 4, 1969, Ser. No. 830,250
Claims priority, application Japan, June 11, 1968, 43/39,663
Int. Cl. D02g *3/04*; D02j *1/12*; D03d *13/00*
U.S. Cl. 57—140 R **3 Claims**

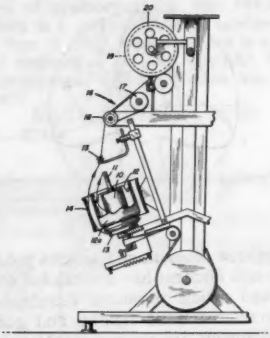
A polyester composite multifilament yarn composed of a plurality of individual filaments having combined properties of the shrinking properties restricted as follows.

	Percent
(1) A range of apparent shrinkage when the yarn is treated in hot water at a stretched condition of approximately 5 mg./denier	0~20
(2) Substantial shrinkage when the yarn is treated by the same manner as in case of measuring the apparent shrinkage of yarn	Lower than 3

The above-mentioned composite multifilament yarn can be also defined with respect to the density of filament, or number of crimps after treatment in boiling water. The

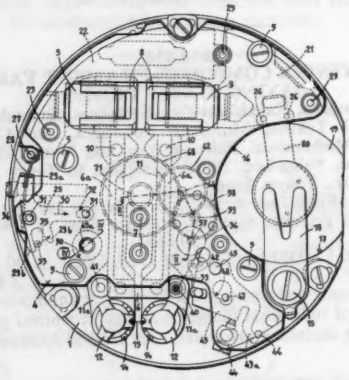
preferable condition of the density of filament is restricted at more than 1.3850 while the number of crimps is restricted a range from 10 to 35/cm.

3,616,635
METHOD FOR HEAT STABILIZATION OF SYNTHETIC THERMOPLASTIC YARNS OR THREADS
Philip R. Petersen, Charlotte, N.C., assignor to Dixie Yarns, Inc., Chattanooga, Tenn.
Filed Sept. 16, 1968, Ser. No. 762,235
Int. Cl. D01h *1/10, 13/28*
U.S. Cl. 57—157 R **3 Claims**



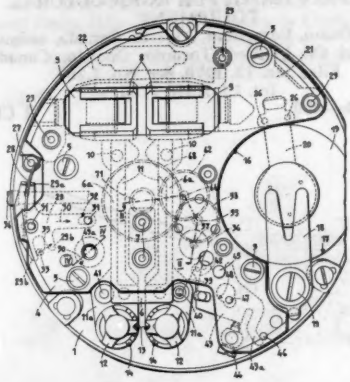
This application discloses a two-for-one twister with a tension-control to the collecting bobbin where a dense body of thread is wound for subsequent heat-treatment to stabilize elongation characteristics.

3,616,636
ELECTRIC TIMEPIECE
Remy Chopard and Rene Besson, Neuchatel, Switzerland, assignors to Ebauches S.A.
Filed Feb. 27, 1970, Ser. No. 15,028
Claims priority, application Switzerland, Mar. 17, 1969, 3,925/69
Int. Cl. G04c *3/00*
U.S. Cl. 58—23 **5 Claims**



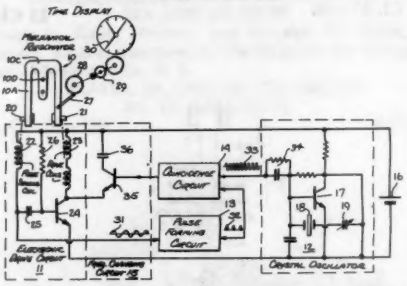
In an electric timepiece, the combination of a flexible resonator having a vibrating flexible blade for driving a ratchet counting wheel, in a step by step manner through a train including a pawl, a circular gauge of a smaller diameter than the ratchet counting wheel diameter for functioning in lieu of the ratchet counting wheel in the setting and adjusting operations with the pawl being contactable with the gauge wherefor the tension of the pawl corresponds to a value sufficient to satisfactorily operate the counting mechanism.

3,616,637
ELECTRIC TIMEPIECE
Rene Besson, Neuchatel, Switzerland, assignor to Ebauches S.A.
Filed Feb. 27, 1970, Ser. No. 15,062
Claims priority, application Switzerland, Mar. 17, 1969, 3,924/69
Int. Cl. G04c *3/00*
U.S. Cl. 58—23 **2 Claims**



A frame of an electrical timepiece characterized by a pair of base plates removably secured to each other, one mounting the driving and regulating devices and the other mounting the hour indicating element and gearing therefor, with an intermediary rotatable element insuring the connection between the gearing and the driving and regulating devices and being rotatably mounted by one of its ends in one base plate and by its other end in the other base plate.

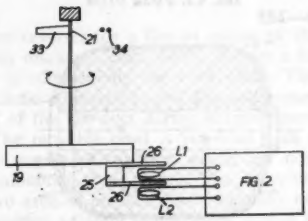
3,616,638
CRYSTAL-CONTROLLED MECHANICAL RESONATOR
William O. Bennett, Bayside, N.Y., and Dale R. Koehler, Westwood, N.J., assignors to Bulova Watch Company, Inc., New York, N.Y.
Filed Mar. 19, 1970, Ser. No. 21,033
Int. Cl. G04c *3/00*
U.S. Cl. 58—23 TF **10 Claims**



A miniature timepiece driven by a tuning-fork motor whose vibratory action is electromagnetically sustained by an electronic drive circuit. To regulate the timing rate of the motor, a frequency standard is provided in the form of a crystal oscillator whose frequency is an exact multiple of the prescribed timing frequency of the motor. The motor is preset to operate at a timing rate displaced to one side of the prescribed frequency to a degree determined by the maximum anticipated deviation in timing rate characteristic of the motor. To effect regulation, pulses

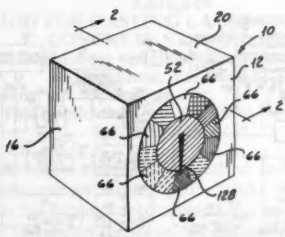
are derived from the electronic circuit, the pulses having a periodicity equal to the operating frequency of the fork. These pulses are compared in a coincidence circuit with the standard oscillations to produce an error signal only when the pulses are displaced in phase from the particular submultiple of oscillations which corresponds to the prescribed frequency. The error signal activates a frequency-correction circuit coupled to the electronic drive circuit associated with the tuning-fork motor, whereby the phase of the pulses derived from the electronic circuit shifts in a direction to bring about phase-locking with said submultiple.

3,616,639
PULSE GENERATOR
William R. Boyle, Wimborne, England, assignor to The Glacier Metal Company Limited, Alperton, Wembley, Middlesex, England
Filed Oct. 24, 1968, Ser. No. 770,244
Claims priority, application Great Britain, Oct. 26, 1967, 48,782/67; July 1, 1968, 31,289/68
Int. Cl. G04c *3/04*
U.S. Cl. 58—28 **11 Claims**



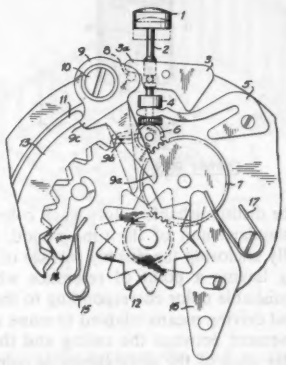
This invention is a method of accurately timing control pulses for a clock mechanism using a pendulum. The nearest prior art known is an extract from a book "Horlodges a Balancier Pendulaire" pages 67 and 68, a copy of which is attached.

3,616,640
CHROMATIC CLOCK
Morton Resnicoff, New York, N.Y., assignor to Art Cycle Inc.
Filed Mar. 12, 1970, Ser. No. 18,911
Int. Cl. G04b *19/30*
U.S. Cl. 58—50 **14 Claims**



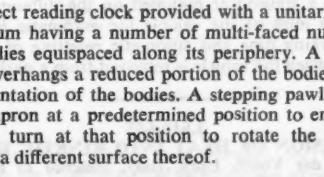
A chromatic clock in which twelve segments of an annular space on the clock face are continuously illuminated with different respective colors and in which the enclosed circular space is sequentially illuminated with colors matching those of the segments as the hours pass so that an observer is immediately made aware of the hour of the day. A minute hand cooperates with the segments of the annulus immediately to make the observer aware of the particular five-minute interval of the hour.

3,616,641
DATE AND DAY CORRECTING DEVICE OF A CALENDAR TIMEPIECE
Tooru Komori, Suwa-shi, Nagano, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan
Filed May 18, 1970, Ser. No. 38,001
Claims priority, application Japan, May 21, 1969, 44/38,930
Int. Cl. G04b *19/24*
U.S. Cl. 58—58 **2 Claims**



A calendar watch having date and day-of-week indicators whereby both date and day-of-week indicators can be changed simultaneously by axial movement of the winding stem or day-of-week only can be changed by said axial movement.

3,616,642
DIGITAL CLOCK
Oskar Obergfell and Günter Hummel, St. Georgen, Germany, assignors to Kundo-Kieninger & Obergfell, St. Georgen im Black Forest, Germany
Filed Apr. 28, 1970, Ser. No. 32,660
Claims priority, application Germany, Apr. 30, 1969, P 19 21 955.7
Int. Cl. G04b *19/02, 45/00;* G06c *27/00*
U.S. Cl. 58—125 C **3 Claims**

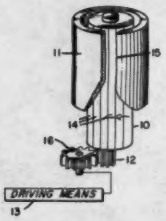


A direct reading clock provided with a unitarily molded hour drum having a number of multi-faced numeral display bodies equispaced along its periphery. A stationary apron overhangs a reduced portion of the bodies to maintain orientation of the bodies. A stepping pawl is formed on the apron at a predetermined position to engage each body in turn at that position to rotate the body and exposed a different surface thereof.

3,616,643
TIMEPIECE FOR IDENTIFYING TIME BY COLOR
Marilyn J. Maue, 20 Melwex St., Belleville, N.J. 07109
Filed Jan. 10, 1968, Ser. No. 696,940
Int. Cl. G04b *19/06*
U.S. Cl. 58—127 **32 Claims**

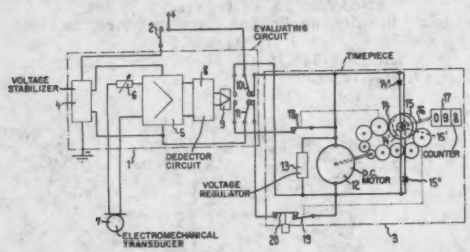
A timepiece for indicating time, preferably a twelve or a sixty minute period, in distinguishable colors each cor-

responding to a standard unit of the time period, which colors are coded on a color carrying member and indicated successively within the time period by a uniform rate of movement between the color carrying member and a point of reference carried by a separate casing member which is employed in association with the color carrying member. A particular timepiece of this invention comprises a cylinder on which is coded, preferably in longitudinal



sections, the distinguishable colors, each color corresponding to a standard unit of the time period, and a casing substantially enclosing the display surface of the cylinder; said casing having a point of reference which indicates the distinguishable color corresponding to the correct unit of time, and driving means adapted to cause uniform rotational movement between the casing and the cylinder so as to display each of the distinguishable colors within the time period.

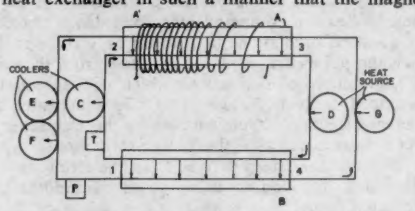
3,616,644
AUTOMATIC PARKING-TIME INDICATOR
Karl Adler, Grenchen, and Georges Ducommun, Feldbrunnen, Switzerland, assignors to Biviator S.A., Geneva, Switzerland
Filed Aug. 11, 1969, Ser. No. 848,789
Claims priority, application Switzerland, Aug. 24, 1968, 12,738/68
Int. Cl. G07c *1/30*
U.S. Cl. 58—143 **8 Claims**



An automatic parking-time indicator mounted in a vehicle, particularly a motor car, and automatically controlled by a transducer mounted on the differential gear of Cardan joint of the vehicle for automatic indication of the parking time and automatic resetting of the time indicator when the vehicle is removed from a parking field.

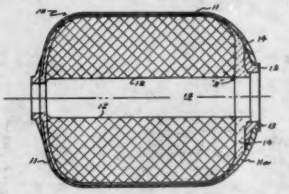
3,616,645
CONVERSION OF HEAT INTO KINETIC ENERGY
Eric van der Voort, Ispra, Italy, assignor to European Atomic Energy Community-Euratom, Brussels, Belgium
Filed Aug. 5, 1968, Ser. No. 750,152
Int. Cl. F01k *27/00*
U.S. Cl. 60—1 **4 Claims**

Converter of heat into kinetic energy using a fluid or suspension having ferromagnetic characteristics, a secondary fluid, a first heat exchanger in which heat is transferred by a secondary fluid to the ferromagnetic fluid; the secondary fluid being caused to circulate in the opposite direction to the ferromagnetic fluid by means of a pump and extracting in a second heat exchanger thermal energy; and varying the magnetic field in the first heat exchanger in such a manner that the magnetic



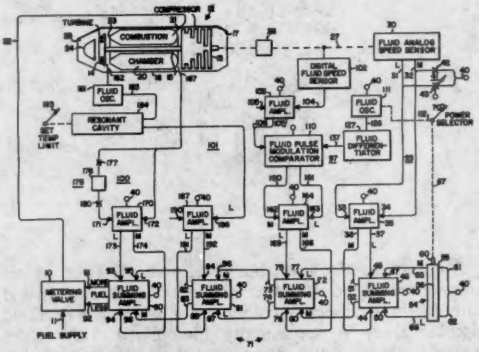
entropy due to the alignment of the magnetic particles of the fluid by means of the magnetic field remains constant.

3,616,646
FORWARD OR AFT STRESS RELIEF FOR A CASE BONDED SOLID PROPELLANT
Alan J. Mikeska, Annandale, and Carl W. Anderson, Jr., Springfield, Va., assignors to the United States of America as represented by the Secretary of the Air Force
Filed Mar. 24, 1970, Ser. No. 22,317
Int. Cl. F02k *9/04*
U.S. Cl. 60—255 **4 Claims**



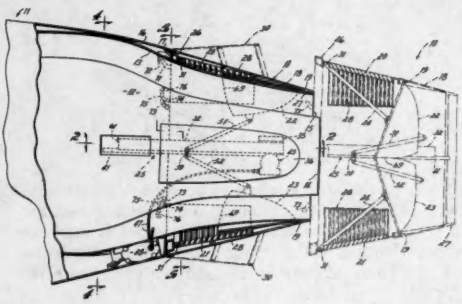
A solid rocket motor-body enclosing a solid propellant grain and having an elastomeric liner interposed in sealed relation between the propellant grain ends and the walls of the motor body to thereby prevent the flow of hot combustion gases thereinto and thus provide for the relief of critical stress concentrations formed during the firing of the propellant grain.

3,616,647
FLUIDIC ENGINE CONTROL SYSTEM
Elmer G. Johnson, Delwood, Minn., assignor to Honeywell Inc., Minneapolis, Minn.
Filed Jan. 4, 1966, Ser. No. 519,403
Int. Cl. F02c *9/04;* **F02g** *3/00*
U.S. Cl. 60—39.28 **5 Claims**



A pure fluid engine control system for controlling the flow of fuel to a gas turbine engine in accordance with a command signal and with the values of various engine variables.

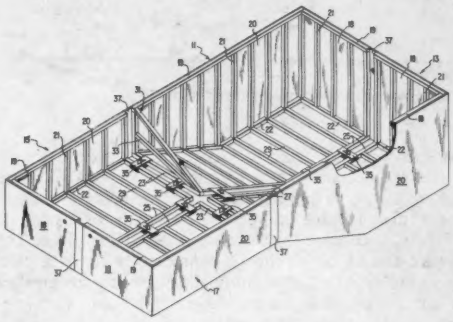
3,616,648
THRUST REVERSER FOR FAN JET ENGINES
Carl A. Weise, San Pedro, Calif., assignor to Aeronca, Inc., Torrance, Calif.
Filed June 26, 1970, Ser. No. 50,224
Int. Cl. F02k 3/02
U.S. Cl. 60—226 21 Claims



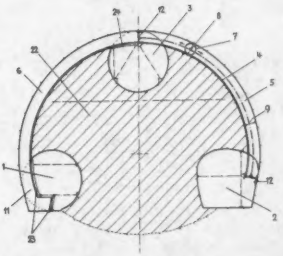
A thrust reverser for a fan jet engine of the type having a main discharge duct surrounded by a fan duct terminating in substantially the same plane. The thrust reverser includes a movable cowl disposed around the outer duct wall of the fan duct during normal operation of the engine. The movable cowl is provided with two sets of forwardly angulated cascades which are normally covered by mounted cover doors. The movable cowl also carries two arcuate blocker doors normally disposed in a stowed position adjacent to the inside wall of the movable cowl. The movable cowl is carried by a pair of translatable rails. The rails are effective to shift the cowl to a position aft of the exhaust ends of the main jet and fan jet ducts. The rails are driven by a rack which is releasably latched to the rails. After the rails have shifted the cowl to its rearmost position, the rack is disengaged from the rails, and is moved rearwardly along the rails. The rack is linked to the movable blocker doors and during its final movement is effective to shift these blocker doors inwardly to block off interior passage through the movable cowl. With the doors in their deployed position, both the main jet stream and fan jet stream impinge upon the doors and are redirected to be discharged through the cascades, whereby they are reversed in direction.

3,616,649
METHOD FOR CASTING LARGE MONOLITHIC CONCRETE STRUCTURES
Randolph Neil Laing, 4500 Richmond Henrico Turnpike, Richmond, Va. 23222
Continuation of application Ser. No. 718,065, Apr. 2, 1968. This application Apr. 10, 1970, Ser. No. 27,440
Int. Cl. E04b 1/16
U.S. Cl. 61—35 17 Claims

This disclosure describes a method and apparatus for casting concrete swimming pools, tanks or walls, etc. In the below-the-ground applications, the preferred method generally comprises the steps of: excavating a hole in the earth; placing inner permanently prebraced forms in the hole; aligning the forms in spaced relationship with the sides of the hole; locking the forms together in an open position; anchoring the forms in the hole; filling open spaces in the sides of the forms; pouring concrete between the forms and the sides of the hole; disconnecting the forms; closing the forms; removing the forms; and, pouring a bottom. The apparatus is adapted to carry out the method and generally comprises a plurality of inner permanently prebraced form sections. Each form section includes outside wall surfaces that define the inner walls of the pool, or the like. These form sections are braced against inner or center brace members. The inner brace members of each form section are locked to inner brace members of other form sections in a separated, predetermined relationship. Also included are means for filling wall spaces occurring between the wall surfaces of adjacent form sections; and, where applicable, means for attaching the form sections to the bottom of a hole. In addition, in connection with swimming pools means are provided for forming a coping at the upper edges of the wall surfaces of the form sections.



3,616,650
METHOD AND APPARATUS FOR CONSTRUCTING SUBTERRANEAN STRUCTURES
Arnold Ph. Eber, Munich, Pasing, and Johann A. Heilbrunner, Munich, Solln, Germany, assignors to Alfred Kunz & Co., Munich, Germany
Filed Sept. 18, 1969, Ser. No. 859,098
Claims priority, application Germany, Jan. 27, 1969, P 19 03 911.3
Int. Cl. E01g 3/04
U.S. Cl. 61—42 4 Claims

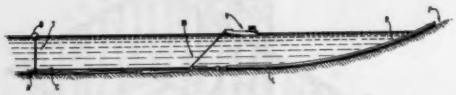


The invention relates to a method for excavating cavities in the construction of subterranean structures such as tunnels where pilot tunnels are driven within the cross-section of a main tunnel to be formed, peripheral cavities are formed between the pilot tunnels, concrete is poured into the peripheral cavities to form the main tunnel lining, and the earth between the pilot tunnels then excavated. The partial peripheral cavities are formed by moving a cutting tool back and forth throughout the cross-sectional peripheral path of the main tunnel and advancing the cutting tool longitudinally of the tunnel.

3,616,651
APPARATUS AND METHODS FOR LAYING UNDERWATER PIPELINES

N. Ming Chang, San Francisco, and Harold V. Anderson, Novato, Calif., assignors to Santa Fe International Corporation

Filed Sept. 24, 1969, Ser. No. 860,643
Int. Cl. F16l *1/00*; B25j *5/02*
U.S. Cl. 61—72.3 12 Claims

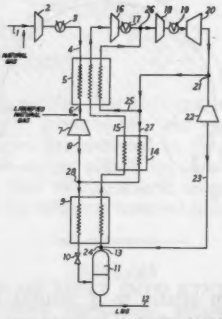


A cable extends from the shore in a prepared trench on the sea bottom out to an offshore site and is there anchored. A pipe pulling assembly, including a pair of fluid actuated cable grippers and a pair of hydraulic cylinders, is coupled to the cable adjacent the shore. The seaward end of the pipeline is connected to the pipe pulling assembly. The pipe pulling assembly and pipeline are carried on sleds having flotation devices. The grippers are alternately actuated to grip the cable. The cylinders are actuated to successively advance the lead gripper along the cable in the seaward direction away from the following gripper which is clamped to the cable and then to advance the released following gripper along the cable in the seaward direction toward the lead gripper which is clamped to the cable in the advanced position thereby pulling the pipeline behind the pipe pulling assembly.

3,616,652
PROCESS AND APPARATUS FOR LIQUEFYING NATURAL GAS CONTAINING NITROGEN BY USING COOLED, EXPANDED AND FLASHED GAS THEREFROM AS A COOLANT THEREFOR

Manfred O. Engel, Newcastle-upon-Tyne, England, assignor to Conch International Methane Limited, Nassau, The Bahamas

Filed Sept. 11, 1967, Ser. No. 666,680
Claims priority, application Great Britain, Sept. 27, 1966, 43,031/66
Int. Cl. F25j *3/00*
U.S. Cl. 62—11 8 Claims

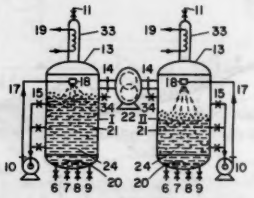


A liquefaction process for natural gas in which the gas is initially liquefied at high pressure, the liquid is expanded and cooled and then flashed to give low pressure liquid and flash gas, and the flash gas is recirculated to cool the incoming gas at various stages of the process. The recirculated flash gas can be cooled by compression and expansion and re-introduced into the system at various points including that at which the liquid gas before flashing is present.

3,616,653
REFRIGERATION IN CYCLES OF FREEZING AND MELTING

Donald F. Othmer, 333 Jay St., Brooklyn, N.Y. 11201

Filed Oct. 4, 1967, Ser. No. 672,755
Int. Cl. B01d *9/04*
U.S. Cl. 62—58 13 Claims

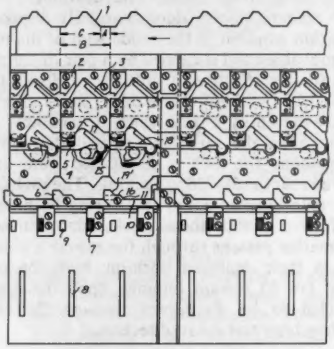


Two similar unitary vessels may be used in a refrigeration cycle to freeze solvent from a solution and to melt the frozen solvent crystals. While the first vessel is used for the evaporation step A, the second is used for the condensation step B. Then the cycle is reversed, with the first being used for step B and the second for step A.

3,616,654
NEEDLE SELECTING MECHANISM FOR MULTI-FEED CIRCULAR KNITTING MACHINES

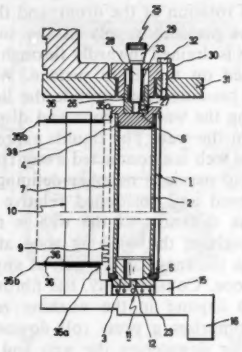
Juan Bibolas Llinas, Calle San Pedro 46, Arenys de Mar, Barcelona, Spain

Filed June 16, 1969, Ser. No. 833,469
Int. Cl. D04b *9/06, 9/38*
U.S. Cl. 66—25 4 Claims



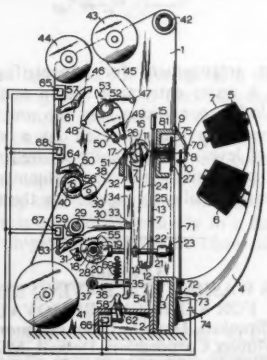
A multi-feed circular knitting machine having a mechanism capable of bringing about needle selection even though an extremely small circumferential space is available for this purpose. A cam cylinder carries a plurality of circumferentially distributed cam sets each of which has an initial needle-selecting region and a subsequent much wider knitting region. The needle cylinder has lower selecting jacks, upper needle jacks, and intermediate selection-transmission jacks. Each cam set has an upper knitting region and a lower selecting region. This lower selecting region of each cam set coacts with the lower jacks and the intermediate jacks for retaining at the intermediate jacks selections made with the lower jacks so that in the lower selecting region of each cam set selections may initially be made for needles which are to carry out knitting functions in the next-following cam set. At this next-following cam set there is in circumferential alignment with the initial region thereof a camming structure which transmits the selection retained by the intermediate jacks to the upper jacks substantially instantaneous selection of needles in an extremely small circumferential space at the initial region of each cam set.

3,616,655
SELECTOR DRUMS FOR CIRCULAR KNITTING MACHINES
José M. Dalmau Guell, San Bruno 103, Badalona, Spain
Filed July 10, 1970, Ser. No. 53,817
Int. Cl. D04b *15/74*
U.S. Cl. 66—50 3 Claims



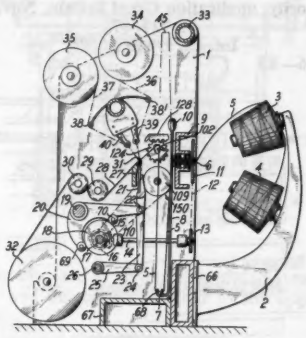
Selector drums for circular knitting machines with a lower base having a slot and a bore corresponding respectively with a diametral rib and pin of a rotary pad mounted on one ring of the machine, the upper cover of said drum being rotatably couplable to an axially displaceable shaft mechanism. The upper cover has a recess in which there is inserted a bushing fixed to an axial rod surrounded by a helical spring which urges the bushing into coupling engagement with the recess in the cover, the axial rod being connected to a knob to which traction may be applied against the spring pressure to pull the bushing out of the recess, leaving the upper end of the drum free and allowing for its easy removal.

3,616,656
WARP KNITTING MACHINE
Stefan Fürst, Monchen-Gladbach, Germany, assignor to Walter Reiners, Monchen-Gladbach, Germany
Filed July 17, 1969, Ser. No. 842,553
Claims priority, application Germany, July 19, 1968, P 17 60 922.2
Int. Cl. D04b *23/00*
U.S. Cl. 66—84 9 Claims



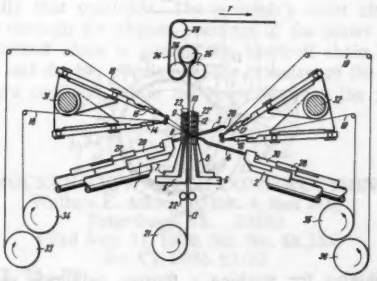
Warp knitting machine, such as a Raschel knitting machine particularly, having a device for filling a weft includes thread monitoring means disposed in the path of the weft and responsive to a break in the weft for controlling the stitch-forming members and the knitted fabric winding means of the machine.

3,616,657
WARP KNITTING MACHINE
Stefan Fürst, Monchen-Gladbach, Germany, assignor to Walter Reiners, Monchen-Gladbach, Germany
Filed July 24, 1969, Ser. No. 844,392
Claims priority, application Germany, July 26, 1968, P 17 60 974.4-26
Int. Cl. D04b *23/00*
U.S. Cl. 66—84 8 Claims



Warp knitting machine having a needle bar zone and means for supplying warp threads thereto includes a weft-filling device having holder members for making a weft ready outside the needle bar zone, the holder members being dispoesd in the vicinity of weft reversal locations and being rotatable in closed travel paths through positions wherein the weft is taken up and delivered by the holder members to the needle bar zone, means for guiding the weft to the warp threads, thread guide means cooperating with the holder members for making the weft ready, the thread guide means being displaceable in the travel path of one of the holder members, the holder members being displaceable in substantially vertical direction and in direction transverse thereto within a plane disposed transversely to the needle bar.

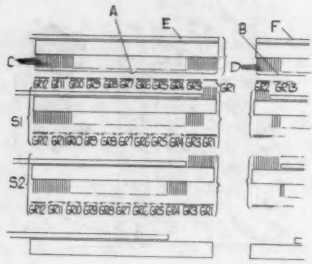
3,616,658
APPARATUS AND METHOD FOR MAKING PILES ON A BASE FABRIC
Frantisek Jindra, Domazlice, Richard Boruta, As, and Bohumil Barton, Kdyne, Czechoslovakia, assignors to Elitex-Zavod textilniho strojirenstvi, generalni reditelstvi, Liberec, Czechoslovakia
Filed Sept. 18, 1969, Ser. No. 858,935
Claims priority, application Czechoslovakia, Sept. 19, 1968, 6,558/68
Int. Cl. D04b *23/02*
U.S. Cl. 66—87 9 Claims



A base fabric, such as a fibrous fleece sheet, is perforated from opposite sides by needles knitting wales and courses. The loops of successive courses are alternatingly

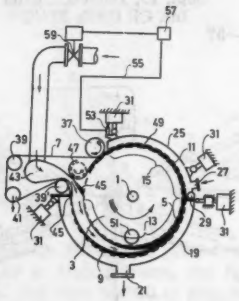
placed in adjacent wales so that back loop portions extend between adjacent wales, and can be drawn out to form pile loops.

3,616,659
STRAIGHT BAR KNITTING MACHINES
Peter Le Good and Reginald Richard Billson, Loughborough, Leicestershire, England, assignors to William Cotton Limited
Filed Nov. 15, 1968, Ser. No. 776,143
Claims priority, application Great Britain, Nov. 25, 1967, 53,727/67
Int. Cl. D04b *11/04*
U.S. Cl. 66—88 **9 Claims**



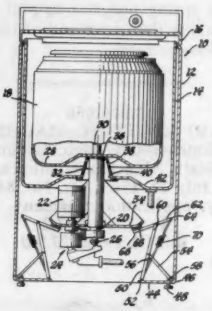
In a method of changing from rib to plain fabric, in a straight bar knitting machine, wherein there are half as many machine needles as frame needles, using loop spreader elements associated with the machine needles for transferring their rib loops to adjacent empty frame needles, and at the same time using spaced individual ones of modified loop spreader elements to double their associated loops with loops on their adjacent frame needles, the spaced groups of loops thus formed by the spaced loop doublings being subsequently closed together, by use of points for ensuing production of non-rib fabric.

3,616,660
APPARATUS FOR WASHING FIBROUS MATERIAL
Gosta Ingemar Ingermarsson, Karlstad, Sweden, assignor to Aktiebolaget Karlstads Mekaniska Werkstad, Karlstad, Sweden
Filed May 22, 1969, Ser. No. 826,873
Claims priority, application Sweden, May 24, 1968, 7,004/68
Int. Cl. D06f *29/00*
U.S. Cl. 68—22 R **15 Claims**



Apparatus for washing a fibrous, cellulosic material suspended in a liquid comprises a drum having a shell pervious to the suspension liquid and substantially nonpervious to the fibrous material, a member defining a web-forming zone along the portion of the drum, a liquid pervious member defining a washing zone along a second portion of the shell and a flexible foraminous belt trained around the drum within the members and mounted for movement with the drum surface. The suspension liquid is introduced at the upstream end of the web-forming zone between the foraminous belt and the drum surface. The member defining the web-forming zone is formed and positioned such that the web-forming zone is tapered in the direction of rotation of the drum, and thus under the influence of the pressure supply of the suspension, the fibrous material is drained inwardly through the shell and a web is formed on the drum surface. Wash liquid is supplied under pressure from outside the liquid pervious member defining the washing zone and displaces suspension liquid from the web. The liquids expressed and displaced from the web are conducted away from inside the drum. The liquid pervious member defining the washing zone is so formed and positioned relative to the drum surface that the thickness of the web is maintained at all points throughout the washing zone at a value not greater than the thickness of the web at any point in the web forming zone. Consequently, the fibrous material is not allowed to expand in the washing zone. The apparatus also comprises a press roll downstream of the washing zone for dewatering the web and a device for removing the web from the apparatus.

3,616,661
FULCRUM LEVER AND SPRING SUPPORT FOR A CENTRIFUGAL SPIN TUB
Melvin A. Menk, Edgewood, Ohio, assignor to General Motors Corporation, Detroit, Mich.
Filed July 7, 1970, Ser. No. 52,885
Int. Cl. D06f *37/24*
U.S. Cl. 68—23.3 **3 Claims**

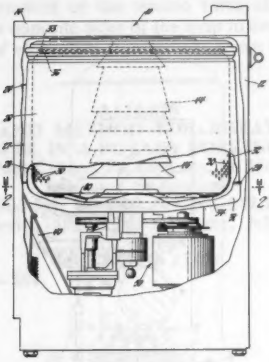


A support arrangement for a centrifugal extracting tub such as a water extracting tub in a clothes washer wherein a clothes containing spin tub and its associated driving components are mounted on a snubber plate. A plurality of levers are pivotally secured within a cabinet and are spring biased into engagement with the snubber plate thereby resiliently supporting the tub within the cabinet.

3,616,662
CLOTHES WASHER TUB HAVING STEP MEANS FOR SEDIMENT REMOVAL
Byron L. Brucken, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.
Filed July 17, 1970, Ser. No. 55,883
Int. Cl. D06f *23/04, 39/10*
U.S. Cl. 68—18 D **5 Claims**

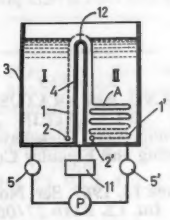
A domestic clothes washer has a pair of nested tubs one of which is imporforate to retain the washing fluid, the other of which is perforate and rotatable to centrifuge the washing fluid from clothes being washed therein. An

agitator in the perforate tub provides a pulsating toroidal circulation of washing fluid. The bottom wall of the perforate tub has a series of sediment removal holes protected from the pulsing circulation of washing fluid by an annular step down outboard of the agitator. The protection



of the step down creates eddy currents over the holes during each pulse of washing fluid to trap sediment. Between each pulse sediment thus trapped drops through the holes for removal from the clothes washer during rotation of said perforate tub.

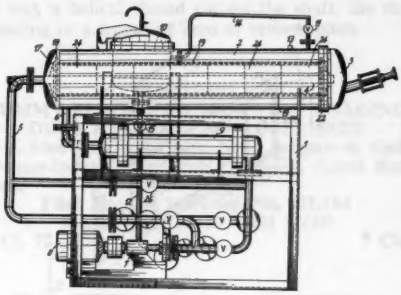
3,616,663
APPARATUS FOR DYEING CLOTH
Goro Matsuda, 73, 1-chome, Kurokawa Honduri Kitaku, Nagoya, Aichi Prefecture, Japan
Filed Nov. 14, 1969, Ser. No. 876,947
Int. Cl. D06f *17/02, 39/04*
U.S. Cl. 68—184 **1 Claim**



The invented apparatus for dyeing cloth in a flat state comprises a dyeing vat divided into two compartments of substantially equal volumes by means of a hollow partition wall having fluid jetting openings at its top. The dyeing solution contained in one compartment is jetted from the top of said partition wall so as to raise the cloth striding over the partition wall and at the same time, the cloth is carried successively in a flat state into the adjacent compartment by the overflow of the dyeing solution.

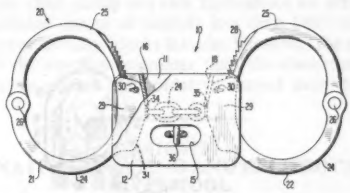
3,616,664
INSTALLATION FOR DYEING SLEEVES
Pierre Libbrecht, Tournai, Belgium, assignor to S.A. Teinturerie des Francs, Tourcoing, France
Filed Sept. 12, 1968, Ser. No. 759,291
Int. Cl. B05c *8/02*
U.S. Cl. 68—189 **1 Claim**

Apparatus for dyeing and the treatment of loosely wound sleeves comprising a horizontal working tank, a horizontal perforated material holder for the sleeves within the tank, an extractor disc slidably mounted on the holder, operating rods extending parallel to the holder and



fixed to the disc and a second disc slidably mounted on the holder and detachably secured to the opposite ends of the rods.

3,616,665
HANDCUFF SHIELD
Samuel Nathan Rosenthal, 2638 Midway Road, Decatur, Ga. 30030
Filed Dec. 31, 1969, Ser. No. 889,539
Int. Cl. E05b *75/00, 17/14*
U.S. Cl. 70—16 **5 Claims**

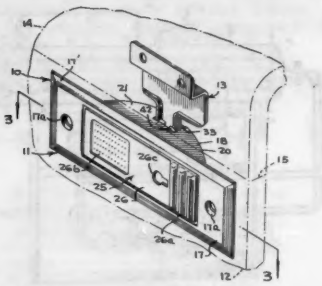


A handcuff shield comprising a pair of spaced apart parallel plates rigidly connected to each other by a pair of braces extending between the plates. Aligned openings are defined in the central portion of the plates. The plates are passed downwardly about the chain which connects together a pair of handcuffs, and the braces between the plates are spaced apart and angled so as to abut the bracelets of the handcuffs and hold the chain in a substantially taut condition. The prisoner's waist chain is passed through the aligned openings of the plates below the handcuff chain to confine the handcuff chain in the shield, and the key openings to the bracelets of the handcuffs are confined within the space between the plates.

3,616,666
ROCKER TYPE LATCH CONSTRUCTION
Wallace E. Atkinson, Rte. 4, Box 210, Petersburg, Va. 23803
Filed Aug. 31, 1970, Ser. No. 68,333
Int. Cl. E05b *65/52*
U.S. Cl. 70—70 **14 Claims**

A latch including lock means for luggage cases and the like including a keeper to be mounted on the upper case section, and a latch unit to be mounted on the lower case section. The latch section includes a housing

defining a concave well and a latch member supported therefrom for circumferential movement between latching and unlatching positions. The latch member is formed of sheet material, having circular segment upper and



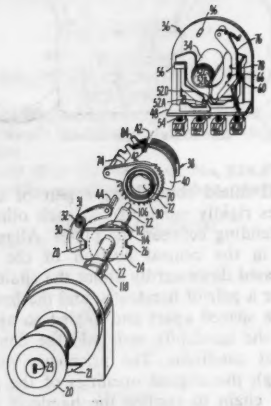
lower flanges which may be sprung inwardly somewhat during assembly and have outwardly projecting lug protions which are interfitted into slots in upper and lower walls of the concave well to slidably support the latch member in the well.

3,616,667

PUSH BUTTON DOOR LOCK

Thomas K. McGourty, Aptos, Calif., assignor to Time Research & Development Corporation

Filed Jan. 27, 1970, Ser. No. 6,167
Int. Cl. E05b *37/16*
U.S. Cl. 70—285 **9 Claims**



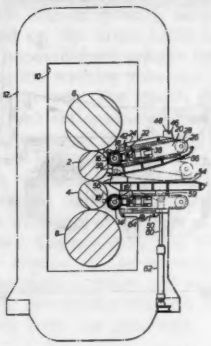
A compact push button door lock is provided which can be installed in an ordinary door without enlarging the normal opening through which a conventional lock is installed and utilizing a standard latch. The lock includes a plurality of friction driven discs each of which has a control button. A large number of permutations are possible despite the small size of the lock making it almost impossible for someone who does not know the combination to open the lock. In accordance with one embodiment of the present invention, the discs are provided with breakout members so that the home owner can provide his own combination. The lock can also be opened in the usual manner with a key.

3,616,668

ROLL CLEANING BRUSHES FOR ROLLING MILLS

Cyril E. Smith, Ringwood, England, assignor to Loewy Robertson Engineering Company Limited, Dorset, England

Filed Nov. 26, 1969, Ser. No. 880,245
Int. Cl. B21b *45/02, 27/04*
U.S. Cl. 72—40 **7 Claims**



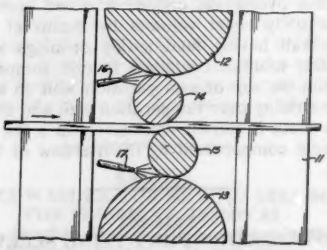
Roll cleaning apparatus for a rolling mill comprises for each work roll a rotatable brush mounted on displaceable carriers, the carriers are displaced between a first position in which the brush is in brushing relation with the roll and a second position in which the roll is away from the vicinity of the roll. The brushes may be removed from the carriers when the carriers are in the second position. The carriers are pivotable about fixed pivots and when both work rolls have roll cleaning apparatus, the carriers of one brush are pivoted about the mill housings and the carriers of the other brush are pivoted about the carriers of the first brush. The carriers of the two brushes may be connected together and the carriers pivoted together about the mill housings.

3,616,669

METHOD OF AND APPARATUS FOR ROLLING FLAT STRIP

Charles Storer Shumaker, Glenshaw, Pa., assignor to United Engineering and Foundry Company, Pittsburgh, Pa.

Filed June 13, 1969, Ser. No. 833,045
Int. Cl. B21b *27/06*
U.S. Cl. 72—200 **6 Claims**



The disclosure of the present invention relates to a 4-high strip rolling mill, wherein the work rolls are offset and on opposite sides of a plane containing the axes of the backup rolls of the mill. The strip is caused to alternately wrap around a portion of each work roll in a

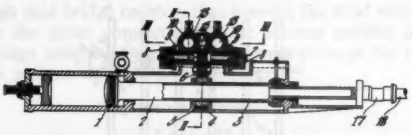
manner to effect an overall reduction in the thickness of the strip by compression from the rolls, and at the same time subject the opposite sides of the strip as they come into contact with the work rolls alternately to a tension force sufficient to elongate by tension the opposite sides of the strip. The disclosure includes a roll heating and cooling system for varying the crown of the work rolls and hence, the amount of the tension force alternately imposed on the opposite sides of the strip in order to change the degree of elongation transversely across the strip.

3,616,670

DEVICE AND METHOD FOR ROTATING THE MANDREL IN A ROTARY FORGING MILL

Jean-Paul Calmes, En Pernessy, Le Mont-sur-Lausanne, Switzerland

Filed July 16, 1969, Ser. No. 842,118
Claims priority, application Germany, July 31, 1968, P 17 52 888.0
Int. Cl. B21b *17/08*
U.S. Cl. 72—209 **7 Claims**



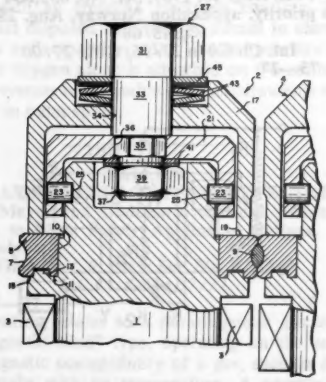
The recoil device of a rotary forging mill is enabled to obtain uni-directional rotation of the hollow, or workpiece, between working strokes in such a manner that the angle of rotation is independent of the length of stroke of the recoil piston. There is a shaft operatively connected to the mandrel holder in such a way that rotation of the shaft is transmitted to the mandrel holder. The shaft is rotated by two pressure-fluid operated pistons which can be coupled in turn to the shaft. The pistons are also coupled to each other so that as one piston makes a working stroke the other piston makes a return stroke.

3,616,671

ROLL FOR ROLLING MILLS

Georges Notari, Monte Carlo, Monaco, assignor to Ugine-Carbone, Paris, France

Filed Oct. 21, 1969, Ser. No. 868,164
Claims priority, application France, Oct. 22, 1968, 170,807
Int. Cl. B21b *31/08*
U.S. Cl. 72—237 **4 Claims**



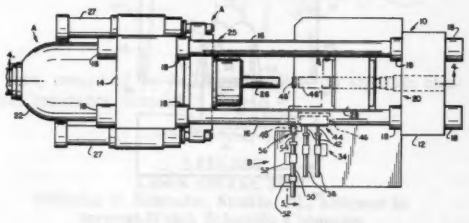
A rolling mill roll includes a shaft having a shoulder thereon, a profile-defining ring engaged about the shaft and against the shoulder, and quick-release means for holding the ring in place. These comprise an outer dished ring fitting with clearance over the end of the shaft and bearing against the profile ring, an inner dished ring coupled to the outer ring, and at least one pin extending radially inward from the inner dished ring for engagement with a helical thread cut on the shaft, the thread terminating in a length of zero or reverse pitch.

3,616,672

DUMMY BLOCK AND/OR BILLET LOADING DEVICE FOR EXTRUSION PRESSES

Alois J. Moos, Kew Gardens, N.Y., assignor to Gulf + Western Industrial Products Company, Grand Rapids, Mich.

Filed Aug. 19, 1969, Ser. No. 851,194
Int. Cl. B21c *33/00;* **B21j** *13/10*
U.S. Cl. 72—270 **7 Claims**



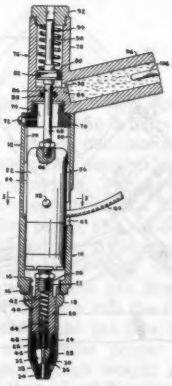
The drawings show a long stroke extrusion press provided with mechanisms for supplying dummy blocks and billets to the pressure container. The mechanisms include tubular, open ended, holder assemblies having an internal diameter to receive the billets or dummy blocks. The holders are open along one side throughout an arcuate or circumferential extent of slightly less than 180° to maintain billets or dummy blocks therein. However, the chordal extent of the opening is greater than the diameter of the press ram to permit the holder to retract over the ram.

3,616,673

COMBINATION ROTATING AND RECIPROCATING RIVET TOOL

Louis F. Miklos, 6151 Delaware St., Gary, Ind. 46409

Filed Aug. 12, 1969, Ser. No. 849,432
Int. Cl. B21d *9/05*
U.S. Cl. 72—391 **6 Claims**



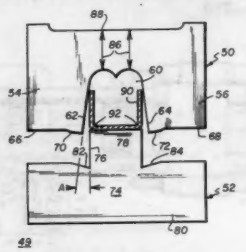
A combination rotating and reciprocating tool for holding a blind rivet. It is contemplated that the blind rivet be

formed with a drill head which is rotated by the tool for purposes of drilling through panel or structural members to be riveted together. Upon the drilling of the hole through the panel members, the tool is actuated to pull the stem of the rivet to upset the rivet and form the rivet into a fastening element. Further pulling will accomplish the breaking of the stem. This invention accomplishes the entire drilling and riveting operation in rapid sequence.

3,616,674
DIE SET

Raymond F. Piasecki, Hazlet, and Lai Che Kuo, Elizabeth, N.J., assignors to Thomas & Betts Corporation, Elizabeth, N.J.

Filed Mar. 4, 1970, Ser. No. 16,292
Int. Cl. B21d *37/00*
U.S. Cl. 72—412 **49 Claims**

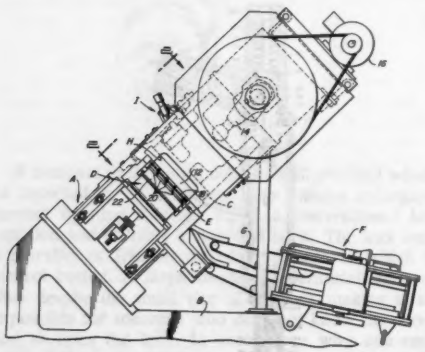


A die set comprised of a first deflectable die member and a matingly cooperable second die member, for selectively deforming a ferrule or similar article interposed in the cavity of said first die member. The interengagement of said first and second die members causes the partial deflection of said first die member, and the consequent alteration of the width of said cavity. Deflectable lever means, positioned within said cavity, assist the release of the deformed ferrule from within the die upon the disengagement of the die members.

3,616,675
BLANK EJECTOR ASSEMBLY FOR PRESSES

Ronald H. D. Armbruster, Battle Creek, and Jon Harrison Brownell, Hastings, Mich., assignors to Gulf + Western Industrial Products Company, Grand Rapids, Mich.

Filed Aug. 26, 1969, Ser. No. 853,144
Int. Cl. B21d *45/00*; B26d *7/00*
U.S. Cl. 72—427 **3 Claims**

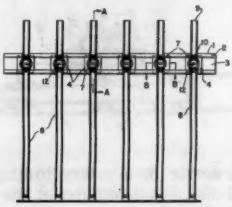


An ejector assembly for ejecting blanks from the die area of a press having multiple dies. The dies are arranged diagonally across the press bed, and the ejector assembly is positioned on one side of the press so that some of the dies are remote from the assembly. The assembly comprises a kicker arm pivotably suspended from the press above the die area, an elongated kicker slide, a stationary slide holder mounted on the press on which the kicker slide is guided into an out of the area of the remote dies, and linkage means connecting the kicker arm with the kicker slide to translate arcuate motion of the arm into linear motion of the slide. A cam means on the press ram actuates the kicker arm in timed relationship therewith whereby the slide ejects blanks from the die area.

3,616,676
JIG DEVICE FOR BENDING SHELL PLATING IN SHIP BUILDING WORK

Isaburo Takeyasu, 5–21 Nogami, 2-chome, Takarazuka, Hyogo Prefecture, Japan

Filed May 8, 1969, Ser. No. 822,927
Int. Cl. B21d *37/04*
U.S. Cl. 72—481 **2 Claims**

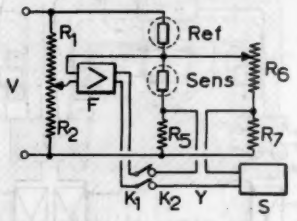


A jig device for bending shell or outside plating in ship building work, which comprises a channel shaped main bar, a plurality of crosshead members slidable along said channel shaped main bar, a plurality of channel shaped slide bars, each adapted to slide longitudinally and adapted to be oscillated according to sliding movement of said crosshead members, and a resilient strap connected to one end of each of said slide bars.

3,616,677
ELECTRICAL RESISTANCE BRIDGE WITH A HEAT SENSITIVE RESISTOR FOR THE MEASUREMENT OF THE THERMAL DISPERSION WITHIN THE AMBIENCE OF THE RESISTOR

Mogens Oppegaard, Torshov, Norway, assignor to Asbjorn Oppegaard, Lillestrom, Norway

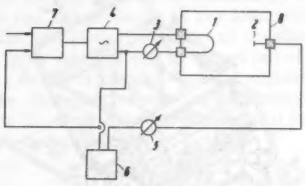
Filed Aug. 28, 1969, Ser. No. 853,664
Claims priority, application Norway, Aug. 28, 1968, 3,345/68
Int. Cl. G01n *27/18*; G01r *27/00*
U.S. Cl. 73—27 **1 Claim**



An electric resistance bridge circuit, including a main bridge and an auxiliary bridge, the main bridge including

a temperature sensitive reference resistor adapted to be influenced by its ambience in a normal or reference state, a temperature sensitive sensing resistor adapted to be influenced by its ambience in a state differing from said normal or reference state, and a bridge resistor in series with said sensing resistor. The reference resistor is arranged in one arm of said main bridge, and the sensing and the bridge resistors are arranged in another arm of said main bridge, an amplifier is included, the input of which is connected to the output of the main bridge, a recording instrument is connected to receive as its input signal a signal derived from the output of the amplifier, the output of the amplifier being connected to diagonally opposite points of said auxiliary bridge, the auxiliary bridge having one of its arms formed by said sensing resistor and another of its arms formed by the bridge resistor, one of the diagonally opposite points being the point of junction between the sensing resistor and the bridge resistor, whereby any imbalance signal in the main bridge is amplified by the amplifier and the resulting output signal current therefrom is divided into a compensating current through said sensing resistor, and a current through said bridge resistor, thus keeping the total voltage across the series connection of the sensing resistor and the bridge resistor as well as the current through the reference resistor substantially constant.

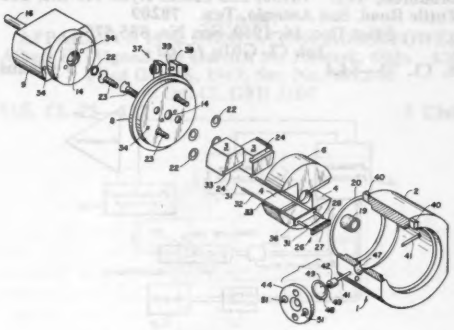
3,616,678
PROCESS FOR MEASURING OXYGEN PARTIAL PRESSURE
Peter Batzies, Am Hirschwald, Germany, assignor to Brown-Boveri & Cie Aktiengesellschaft, Mannheim-Kafertal, Germany
Filed Sept. 15, 1969, Ser. No. 857,830
Claims priority, application Switzerland, Sept. 16, 1968, 13,882/68
Int. Cl. G01n *27/14;* G01r *5/28*
U.S. Cl. 73—26 **4 Claims**



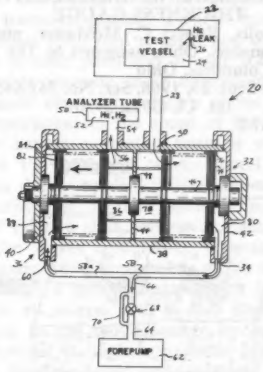
The partial pressure of oxygen in a high vacuum is measured with an emission electrode emitting "heated" electrons and disposed in a heating circuit in electric circuit with a collector electrode. The temperature is kept so high that oxygen alone is adsorbed on the emitter electrode. The system is adaptable for measurements within a chamber or in outer space.

3,616,679
PARAMAGNETIC OXYGEN DETECTOR
Emilio G. Meyer and Gianmario Bardoni, Milan, Italy, assignors to Mine Safety Appliances Italiana, S.p.A., Milan, Italy
Filed Nov. 6, 1969, Ser. No. 874,489
Int. Cl. G01n *27/72*
U.S. Cl. 73—27 A **9 Claims**

This invention relates to a paramagnetic gas analyzer of the "magnetic wind" type, operating on the principle that the magnetic susceptibility of a gas, such as oxygen, varies inversely with its temperature. A sample gas is heated in a non-homogeneous magnetic field inside a cylindrical test chamber. The heating elements are recessed in the surfaces of the end walls of the chamber and function only to generate the magnetic wind, which is, in turn, measured by its thermal effect on separate electrical resistance sensors.

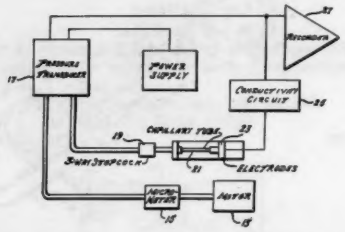


3,616,680
LEAK DETECTOR
Wilhelm F. Schrader, Skokie, Ill., assignor to Sargent-Welch Scientific Company
Filed Oct. 27, 1969, Ser. No. 869,556
Int. Cl. G01m *3/20*
U.S. Cl. 73—40.7 **5 Claims**



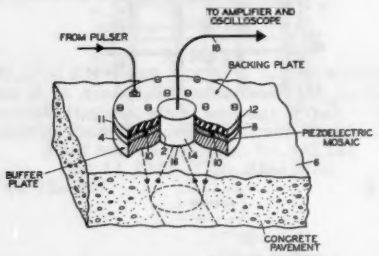
A gas leak detecting system which includes a chamber to be tested or to receive therein articles to be tested for gas tightness under vacuum conditions. A turbo-pump having two compressor pump sections, each having inlet and outlet ends, are provided. The turbo-pump in one section evacuates the vessel through a gas flow line connected to a vacuum fore pump, and the other turbo-pump is an analyzer pump having a low molecular weight gas detector operatively associated with its inlet end, and its outlet end connected to the gas flow line extending between the other turbo-pump and the fore pump. Control means are provided in the gas flow line downstream of this connection, and, under proper conditions, the analyzer pump evacuates high weight molecular gases from the inlet end thereof while permitting the low molecular weighet trace gas to enter the inlet area for accurate detection at a controllably low pressure level.

3,616,681
ELECTRODE SYSTEM FOR SURFACE TENSION DETERMINATION OF FLUIDS
Leopoldo L. Rodriguez, 5511 Rolling Dale, San Antonio, Tex. 78228; Kenneth G. Ikels, 28 Ridge Drive, New Braunfels, Tex. 78130; and James Ryan Neville, 213 Tuttle Road, San Antonio, Tex. 78209
Filed Dec. 16, 1969, Ser. No. 885,575
Int. Cl. G01n *13/02*
U.S. Cl. 73—64.4 3 Claims



An electrode system is attached relative to a capillary tube so that an electrical circuit is completed when the meniscus in the capillary tube holding the sample flattens out as pressure is applied by a motor driven micrometer through a pressure transducer. When this occurs, the conductive properties of the solution close a conductivity circuit which applies a voltage to a recorder thus indicating the end point. The pressure noted at this point is used in the calculation of the surface tension of the liquid sample.

3,616,682
ULTRASONIC NONDESTRUCTIVE THICKNESS GAUGE
Matthew J. Golis, Robert C. McMaster, and Gary L. Cooper, Columbus, Ohio, assignors to The Ohio State University, Columbus, Ohio
Filed Sept. 23, 1968, Ser. No. 761,645
Int. Cl. G01n *29/00*
U.S. Cl. 73—67.7 8 Claims

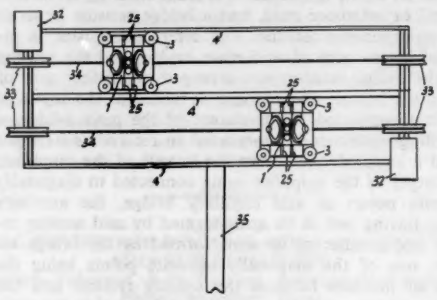


The invention is for an ultrasonic transmitting and receiving device for the nondestructive measuring of the thickness of heterogeneous materials.

3,616,683
APPARATUS FOR THE CONTINUOUS CHECKING OF OVERHEAD CONTACT LINES FEEDING ELECTRICALLY DRIVEN RAILROAD VEHICLES
Sylvestre Pachurka, Cachan, France, assignor to Societe dite: S.A. Materiels Industriels Matisa, Paris, France
Filed July 2, 1969, Ser. No. 838,506
Claims priority, application France, Dec. 23, 1968, 179,978
Int. Cl. G01n *24/00*
U.S. Cl. 73—71.5 3 Claims

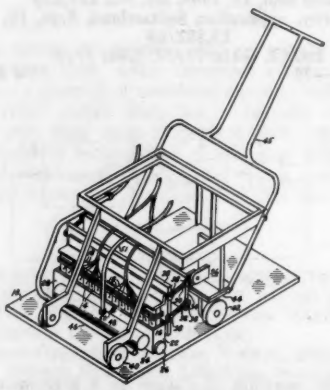
Apparatus for the continuous checking of overhead contact lines feeding electrically driven railroad vehicles.

An apparatus adapted to slide along the overhead wires to be checked for varying diameters and possible defects and to move transversely to follow said wires. It includes a support in which at least one piezo-electric cell is adapted to engage the wire with the interposition of a layer of



water or the like viscous liquid flowing preferably along a closed circuit. The cell transmits signals through a transformer or condenser to indicating or recording instruments.

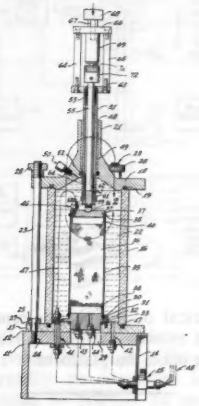
3,616,684
ULTRASONIC INSPECTION CARRIAGE
Edward M. Nusbickel, Jr., Allentown, Pa., assignor to Bethlehem Steel Corporation
Filed Nov. 20, 1969, Ser. No. 878,481
Int. Cl. G01n *24/00*
U.S. Cl. 73—71.5 1 Claim



A carriage is adapted to be moved relative to a flat workpiece during the ultrasonic inspection thereof. A housing containing a row of transducers is suspended from the carriage whereby, as the housing or carriage traverses undulations in the surface of the workpiece, the row of transducers is maintained horizontal and transversely disposed to the direction of movement of the carriage relative to the workpiece. In addition, the bottom of the housing is maintained at a constant distance from the workpiece, while the vertical axes of said transducers are maintained perpendicular to the plane of the workpiece.

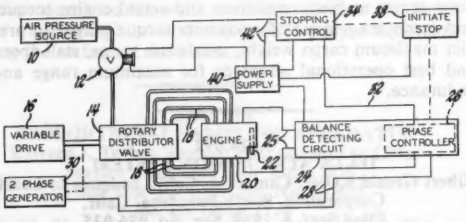
The transducers are ultrasonically coupled to a column of water contained in said housing. A jet of water provides a continuous flow of water between the bottom of said housing and the flat surfaces of said workpiece oppositely disposed therefrom. The housing is supported relative to said flat surfaces such that there is sufficient surface tension to maintain a continuous layer of water between the opposing surfaces of said flat surfaces and said bottom.

3,616,685
LOAD APPLYING DEVICE FOR A PRESSURE TEST CHAMBER
James A. Strom, Whittier, Calif., assignor to Dames and Moore, Los Angeles, Calif.
Filed June 29, 1970, Ser. No. 50,528
Int. Cl. G01n 3/02
U.S. Cl. 73—84 8 Claims



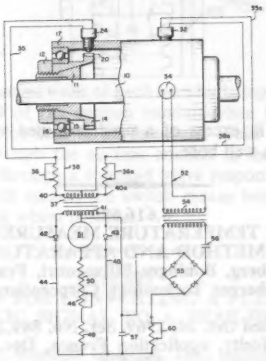
A device for applying a load to a sample within a pressure test chamber employing an outer hollow cylindrical load sleeve sealed by an O-ring in a chamber entrance. An inner load rod slides in the outer load sleeve in longitudinally recirculating ball bushings to move with a minimum of friction and is connected to the end of the load sleeve through a bellows assembly attached both to the end of the inner load rod and to the outer load sleeve. The inner load rod engages the sample within the pressure chamber and the load pressure is measured by that applied to the inner rod independently of any load which may be applied to the load sleeve. The effect of the chamber pressure on the inner load rod may be zeroed out of a read-out or recording device or may be readily computed from the value of the chamber pressure and deducted from the total load on the inner rod to give the actual load applied to the sample in the chamber.

3,616,686
ENGINE STOPPING CONTROL FOR AN AIR-MOTORED ENGINE BALANCING SYSTEM
Joseph F. Lash, Ferndale, Mich., assignor to General Motors Corporation, Detroit, Mich.
Filed Aug. 14, 1970, Ser. No. 63,841
Int. Cl. G01n 15/00
U.S. Cl. 73—116 4 Claims



A circuit is provided in conjunction with an engine balancing system for stopping an engine driven by air pressure with the position of engine unbalance at a predetermined location. A phase-adjusting device in the circuit takes into account the angular position of engine unbalance as well as the amount of engine coasting occurring after a stop signal is issued.

3,616,687
APPARATUS FOR INDICATING HORSEPOWER
Albert H. Wignall, 60 Garrick St., Newark, Ohio 43055
Filed Oct. 16, 1969, Ser. No. 866,842
Int. Cl. G01l 3/00
U.S. Cl. 73—133 5 Claims

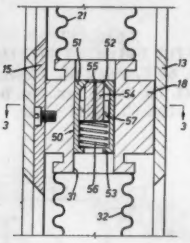


A horsepower indicator for power levels up to about 2,000 H.P. comprising a pair of spaced gears affixed to the power transmitting shaft; the gears having teeth which are equidistant from root to point and of equal pitch on both sides of each point and of each root whereby they are adapted to generate, in an adjacent magnetic pickup, square shaped alternating electric waves having an ampliude proportional to the speed of the gears involved; said gears having a relative position whereby at zero horsepower the generated waves cancel, but when the shaft twists due to applied torque, the waves are of the same polarity for a time span proportional to the amount of relative shift between the gears. In this relationship, the waves combine to generate negative and positive square wave form pulses which are rectified and passed through a galvanometer which is calibrated for horsepower. A reverse bias is also applied to the current leading to the galvanometer by rectifying further waves generated through a magnetic pickup for one of the gears, filtering same, and applying voltage thereby generated across a resistance in series with the galvanometer; the purpose of the reverse bias being to compensate for errors otherwise introduced by vibration and other variables in the apparatus.

3,616,688
GRADIOMANOMETER APPARATUS
Rene Roussin, Marnes-la-Coquette, and Jean-Loup Bonnet, Verrieres-le-Buisson, France, assignors to Schlumberger Technology Corporation, New York, N.Y.
Filed Oct. 21, 1969, Ser. No. 867,993
Claims priority, application France, June 12, 1969, 6919455
Int. Cl. E21b 47/00, 47/06
U.S. Cl. 73—151 5 Claims

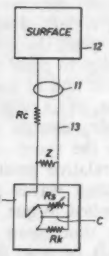
An illustrative embodiment of the present invention includes improvements for use in borehole fluid density measuring apparatus of the gradiomanometer type including an inertia operated check valve. The inertia operated check valve permits free fluid movement from

a measuring bellows of the device into an expansion bellows if the measuring instrument experiences a sudden



acceleration in excess of a predetermined value in moving through a well bore.

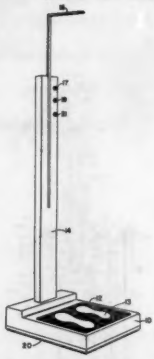
3,616,689
HIGH TEMPERATURE MEASUREMENT METHOD AND APPARATUS
André Scholberg, Boulogne-Billancourt, France, assignor to Schlumberger Technology Corporation, New York, N.Y.
Filed Oct. 24, 1969, Ser. No. 869,293
Claims priority, application France, Dec. 17, 1968, 178,578
Int. Cl. E21b *47/06*
U.S. Cl. 73—154 **17 Claims**



An illustrative embodiment of the invention includes methods and apparatus for measuring temperature and other parameters of interest in a well bore by use of a monocable logging tool. A temperature sensitive element connected to the end of a monocable is supplied with a constant current. The voltage produced at the surface is thereby a function of the resistance of the element. The voltage produced with the temperature sensitive element shorted out and that produced with a known value calibration resistor may then be combined in a manner to eliminate errors due to the resistance of the monocable conductor or any stray monocable insulation leakage resistance.

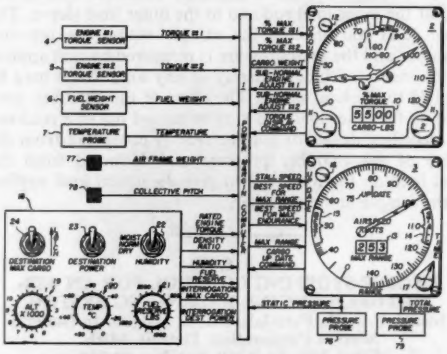
3,616,690
WEIGHT MEASURING APPARATUS
Charles M. Harden, Natick, Mass., assignor to Searle Medidata, Inc., Waltham, Mass.
Filed June 25, 1970, Ser. No. 49,616
Int. Cl. G01g *3/14, 9/00*; G01m *19/00*
U.S. Cl. 73—172 **8 Claims**

Apparatus especially useful in medical screening for determining gross weight and relative weight distribution between the left and right foot of an individual and between the ball and heel of each foot. A platform is provided to support an individual and is in turn supported on three springs each of which has affixed thereto a plurality of strain gauges. The strain gauges are selectively coupled to associated signal processing circuitry operative



to provide electrical output signals representative of the total weight and relative weight distributions of the individual standing upon the platform.

3,616,691
MISSION CAPABILITY INDICATING SYSTEM
William E. Brandau, Westwood, N.J., assignor to The Bendix Corporation
Filed Mar. 26, 1969, Ser. No. 810,668
Int. Cl. G01c *21/00*
U.S. Cl. 73—178 H **19 Claims**

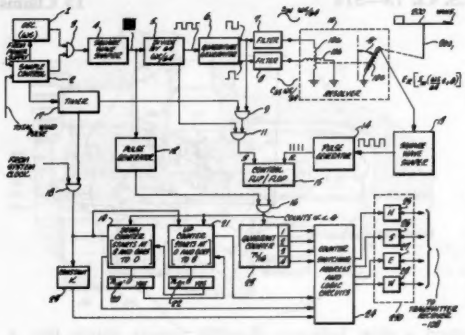


A computer especially adapted for use in helicopters for determining prior to takeoff if the engine has sufficient capability to complete the assigned mission. The computer senses ambient conditions and actual engine torque, and computes percent of maximum torque output to predict maximum cargo weight, maximum range, stall speed and best operational airspeeds for maximum range and endurance.

3,616,692
DATA ACQUISITION SYSTEM
Elbert Gerald Keller, Camarillo, Calif., assignor to Leach Corporation, South Pasadena, Calif.
Filed Sept. 8, 1969, Ser. No. 856,035
Int. Cl. G01f *13/00*
U.S. Cl. 73—189 **14 Claims**

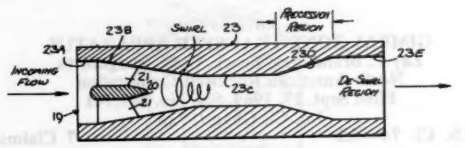
A low power requirement data acquisition system is disclosed. The system is adapted to continuously digitally

record a sensed scaler measurement which may represent, for example, an environmental condition such as "total wind." The system is further adapted to record directional indication values correlated with the scaler measurements. Digital representations of the magnitude



and directional values are stored for later transmission to a remote central processing point. The representative digital data may readily be converted to an accurate vectorial representation to provide an accurate history of the sensed vectorial events.

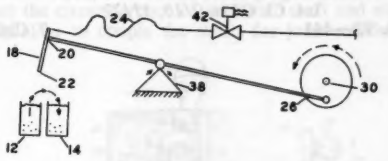
3,616,693
SWIRL-TYPE FLOWMETER
Thomas H. Burgess, Horsham, Pa., assignor to Fischer & Porter Co., Warminster, Pa.
Filed June 16, 1969, Ser. No. 833,449
Int. Cl. G01f *1/00*
U.S. Cl. 73—194 C **10 Claims**



A swirl-type flowmeter whose output frequency is a function of fluid-flow rate, the frequency being substantially linear throughout a broad Reynolds number range. The meter includes a flow tube whose inlet section has a set of fixed swirl blades therein which impart a swirling motion to incoming fluid, the swirling flow being caused to precess in an enlarging section of the tube. The precessional motion is detected to produce voltage pulses whose frequency depends on flow rate. To maintain the desired linear relationship between flow rate and frequency, the geometry of the swirl blades and the inlet section associated therewith is made such as to accelerate flow therethrough to minimize boundary-layer separation along the surface of the blades.

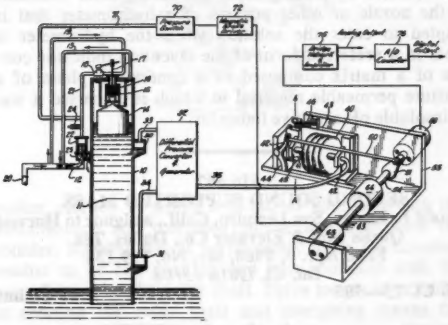
3,616,694
PROPORTIONAL SAMPLING APPARATUS
Edward J. Trebes, Tampa, Fla., assignor to Cities Service Company, New York, N.Y.
Filed Mar. 11, 1970, Ser. No. 18,435
Int. Cl. G01n *1/14*
U.S. Cl. 73—423 A **6 Claims**

A proportional sampling apparatus for selectively withdrawing and proportionately mixing two separate fluids for sampling purposes is disclosed herein. The apparatus comprises a suction conduit vertically mounted on one end of a lever arm, the other end of the lever arm being coupled to a crank wheel. A cam follower is mounted on the lever arm adjacent a triangular shaped cam, acting as the lever arm fulcrum. A pair of launders each containing one of the fluids to be withdrawn is mounted below the suction



conduit, the adjacent walls of each launder being positioned below the level of the suction conduit when it is raised above the level of fluid in the launders. Fluid withdrawn sequentially through the suction conduit is metered into a mixing tank through a solenoid valve responsively controlled by switch means, the switch means being responsive to the crank wheel position.

3,616,695
APPARATUS FOR CONVERTING A PULSATING PNEUMATIC SIGNAL TO A PEAK-HOLDING SIGNAL
Herbert A. Rundell, Houston, Tex., assignor to Texaco Inc., New York, N.Y.
Filed Feb. 10, 1970, Ser. No. 10,160
Int. Cl. G01n *9/12*; G01l *7/00*
U.S. Cl. 73—438 **8 Claims**



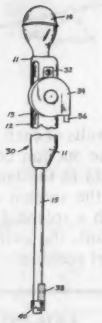
Disclosed is apparatus usable in connection with a borehole drilling fluid density measuring device for converting a pulsating pneumatic signal to a peak-holding signal including a pressure sensing cell for converting the pneumatic signal to mechanical movement of a reciprocating nature, a first shaft coupled with the cell through a movement multiplication linkage adapted to provide angular displacements of the first shaft corresponding to the pneumatic signal, the coupling being adapted to permit the shaft to retain its position during declining periods of the pneumatic signal, a second shaft, a friction clutch coupling the first and second shafts, a return spring urging the first shaft through the linkage to rotate in a downward direction, means including a pressure switch for providing a peak-identifying signal when the pneumatic signal attains each peak and for providing a decline identifying signal when each peak commences its decline, and a magnetic brake coupled to the second shaft for holding it fixed in response to the peak-identifying signal and for releasing it in response to the decline identifying signal. The apparatus further includes output signal generating means for providing an output signal corresponding to the position of the first shaft.

3,616,696

APPARATUS FOR DETERMINING THE SUITABILITY OF SOLUTIONS SUCH AS RADIATOR COOLANT

Thomas B. Ludlow, Arden Hills, and John D. Skildum, St. Paul, Minn., assignors to Johanna Plastics, Roseville, Minn.

Filed Aug. 4, 1969, Ser. No. 847,076
Int. Cl. G01n *9/10, 31/22*
U.S. Cl. 73—441 7 Claims



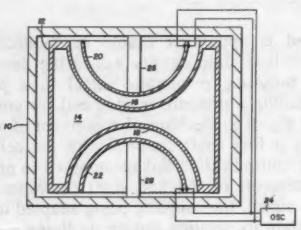
Because the corrosiveness and freezing point of radiator coolant are related, the suitability of the coolant depends on both factors. To determine the condition of the coolants in accordance with the invention the pH and specific gravity are measured simultaneously. This is accomplished by placing a pH measuring color indicator on the nozzle or other portion of a hydrometer that is adapted to enter the solution when the hydrometer is filled. In a preferred form of the invention indicator consists of a matrix composed of a continuous phase of a moisture permeable material in which is dispersed a water insoluble pH sensitive indicator.

3,616,697

SECOND SOUND SUPPORTED MASS

Donald L. Ensley, San Leandro, Calif., assignor to Harvest Queen Mill & Elevator Co., Dallas, Tex.

Filed Apr. 5, 1968, Ser. No. 719,134
Int. Cl. G01p *15/08*
U.S. Cl. 73—505 18 Claims



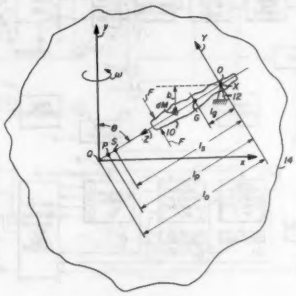
Apparatus and a method for positioning a mass three dimensionally in a stable force field generated by producing entropy waves in liquid helium II. A mass, preferably having an evacuated inner chamber, is contained within a housing filled with the liquid helium II in the space outside the mass. Current passing through a carbon resistance heater mounted within the housing produces entropy waves which produce either a convergent or a divergent force field. The entropy waves produce time average forces at the mass surface that are useful for positioning the mass in the center of the housing cavity.

3,616,698

PENDULOUS ACCELEROMETER

Victor B. Corey and Phillip C. Linwick, Bellevue, and Allan F. Potter, Redmond, Wash., assignors to United Control Corporation, Redmond, Wash.

Filed Apr. 12, 1968, Ser. No. 720,794
Int. Cl. G01p *15/00*
U.S. Cl. 73—514 13 Claims



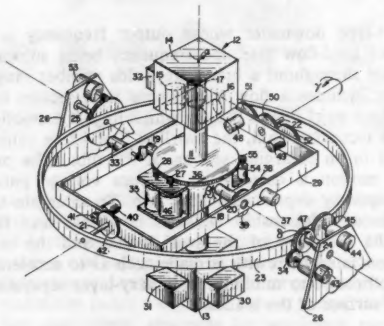
A pendulous accelerometer having a pendulum shaped and pivoted such that its center of spin insensitivity and its center of angular acceleration insensitivity substantially coincide. The accelerometer is mounted with its substantially coincident centers of spin and angular acceleration insensitivity to coincide with the center of gravity of an unstabilized vehicle whose linear acceleration it is to measure, and the accelerometer thereby becomes insensitive to any and all angular accelerations and angular velocities of the vehicle about axes passing through the vehicle center of gravity.

3,616,699

GIMBAL ZONE TRANSFER APPARATUS

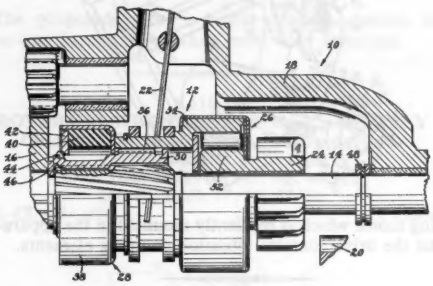
Zay C. Brand, Seal Beach, Calif., assignor to North American Rockwell Corporation

Filed Sept. 29, 1969, Ser. No. 861,741
Int. Cl. G01c *19/28*
U.S. Cl. 74—5.2 7 Claims



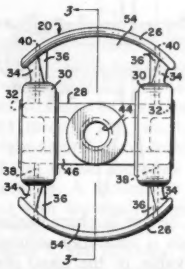
A follow-up control system for a three gimbal four axis inertial platform which utilizes Euler angle logic and electronic sign changing to avoid gimbal flipping when the vehicle on which the platform system is mounted is maneuvering at or near the pitch 90° attitude with a limited amount of roll attitude and which allows gimbal flipping when the aircraft pitches with an amount of roll that allows satisfactory dynamic control of the gimbal.

3,616,700
ROLL CLUTCH STARTER DRIVE WITH SHOCK ABSORBER
Philip L. Patchett, Horseheads, N.Y., assignor to The Bendix Corporation
Filed Oct. 31, 1969, Ser. No. 872,908
Int. Cl. F02n *15/06*
U.S. Cl. 74—7 R 7 Claims



A roll clutch starter drive is provided with a compressible cushion member compressed by axial translation of a splined sleeve to reduce the peak torque applied to the components of the starter drive and to extend the service life of the starter motor and drive.

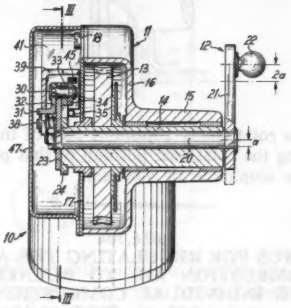
3,616,701
ONE-PIECE CROSSHEAD INCORPORATING A HYDRODYNAMIC BEARING
Robert W. Decker and Frank D. Howe, Painted Post, N.Y., assignors to Ingersoll-Rand Company, New York, N.Y.
Filed Sept. 17, 1969, Ser. No. 858,805
Int. Cl. F16h *21/22*
U.S. Cl. 74—44 13 Claims

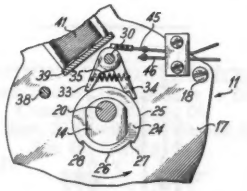


One-piece, cast-iron crosshead, open-ended with throughgoing passages formed therein to avoid a "piston" effect with reciprocation of the casting. Either axial ends of the crosshead are of smaller outside or girth dimension than the intermediate portion, as the shoes have tapered areas at the ends. The tapered areas insure the maintenance of the lubricant-providing bearing, between the shoes and the crosshead guide, in cooperation with lubricant supplied therebetween.

3,616,702
WINDSHIELD WIPER DRIVE
Erich Kolb, Eisental, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany
Filed Dec. 2, 1969, Ser. No. 881,391
Claims priority, application Germany, Dec. 3, 1968, P 18 12 307.4
Int. Cl. A47l *1/00;* F16d *11/06;* F16h *21/18*
U.S. Cl. 74—50 9 Claims

A rotatable inner shaft has opposite ends and is eccentrically located for rotation in a hollow outer shaft which is arranged in axial parallelism. The shafts are rotatable independently of one another. An actuating arm is rigid with one end of the inner shaft projecting transversely thereto for rotation in a circular orbit about a predetermined axis. A shoulder is provided at the circumference of the outer shaft and extends at least substantially radially of the axis. A coupling member is mounted at the upper end of the inner shaft for pivotal movement between two positions in one of which it abuts against the circumference of the outer shaft and engages the shoulder to couple the shafts for joint rotation and



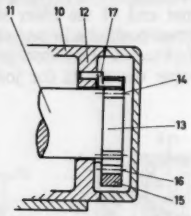


another position in which it is out of abutment with the circumference and therefore out of abutment with the shoulder. Biassing means permanently urges the coupling member to its one position and into abutment with the circumference of the outer shaft. Drive means is provided for rotating the outer shaft and energizing means for energizing and de-energizing the drive means. Control means is operative for moving the coupling member to its other position and for thereupon effecting relative movement of the shafts in a sense causing radial displacement of the actuating arm with reference to its ciricular orbital path.

3,616,703
VIBRATION GENERATOR
Hans-Georg Waschulewski, Mettmann, Hans-Reinhard Lambertz, Hochdahl, and Wilhelm Stoye, Dusseldorf, Germany, assignors to Losenhausen Maschinenbau AG., Dusseldorf-Grafenberg, Germany
Filed June 12, 1970, Ser. No. 46,167
Claims priority, application Germany, June 13, 1969, P 19 30 078.8
Int. Cl. B06b *1/16*
U.S. Cl. 74—87 10 Claims

Three radius rods have a first set of rotatable connections between one end of the rods and a centrifugal weight and a second set of rotatable connections between the other ends of the rods and the frame and with the connections of each set being positioned 120° from each other so that the weight will move in a curvilinear path

defined by the rod combination. A gear drive between the motor and the weight moves the weight about that path. A second similarly mounted centrifugal weight is connected to a rotationally adjustable part of the frame and by changing the rotational position of that part one may change the amplitude of vibration.

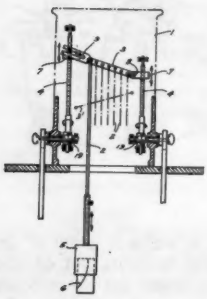


3,616,704

APPARATUS FOR REGULATING THE ADMISSION OF COMBUSTION AIR TO BURNER GRATES HAVING INDIVIDUAL COMBUSTION ZONES

Johannes Josef Martin, 248 Leopoldstrasse, Munich 23, Germany

Filed Oct. 23, 1969, Ser. No. 868,734
Int. Cl. F16h *1/18, 27/02*
U.S. Cl. 74—89.15 **7 Claims**



A plurality of at least substantially parallel control rods are each shiftable a predetermined maximum distance in opposite directions between end positions in which each rod closes and fully opens, respectively, an air admission port communicating with one of the combustion zones of the grate. A linking member extends transversely to the aforementioned directions and is connected with the control rods. Shifting means effects shifting of the linking member in the aforementioned directions in a sense effecting shifting of the respective control rods through different distances between their end positions.

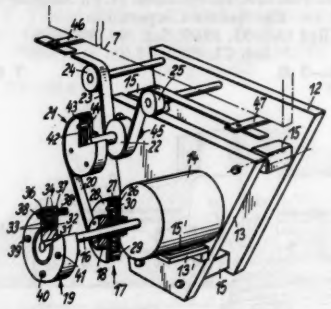
3,616,705

APPARATUS FOR ISOTOPE DIAGNOSIS

Winfried Platz, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Erlangen, Germany

Filed May 15, 1969, Ser. No. 824,955
Claims priority, application Germany, May 30, 1968, P 17 64 397.9-33
Int. Cl. F16h *27/02*
U.S. Cl. 74—89.22 **2 Claims**

In an apparatus for isotope diagnosis to determine the distribution of radioactive substances in a body by means of a radiation detector, drive means is provided for effecting linear scanning movement of the detector over an examination zone of the body. The drive means include a stepping motor which is resiliently mounted in the apparatus and the drive contains vibration damping elements.

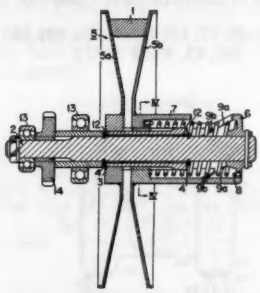


3,616,706

TRANSMISSION DEVICE OF A SHEAVE DRIVE TYPE

Susumu Shimamoto, Hamamatsu-shi, Japan, assignor to Yamaha Hatsudoki Kabushiki Kaisha, Hamakita-shi, Shizuoka-ken, Japan

Filed May 15, 1969, Ser. No. 824,922
Claims priority, application Japan, May 18, 1968, 43/40,724
Int. Cl. F16h *55/52*
U.S. Cl. 74—230.17 **7 Claims**



This transmission device is characterized by having a hollow cylinder which is rotatably secured to the driven shaft, though immovable in the axial direction. To the hollow cylinder is secured a driven sheave pulley consisting of a pair of first and second conically shaped disks, said first disk being fixed to said hollow cylinder and said second disk being splined to said driven sleeve movably in its axial direction within a specified range, though immovably in its rotating direction. Torques are applied only through said second disk from said pulley to the driven shaft, and vice versa.

3,616,707

FLAT LINK CHAIN

Ilya Ilich Ivashkov, 9 Parkovaya, ulitsa 43/26, kv. 198, and Vasily Alexandrovich Frolovtsev, Ferganskaya ulitsa 18, kv. 263, both of Moscow, U.S.S.R.

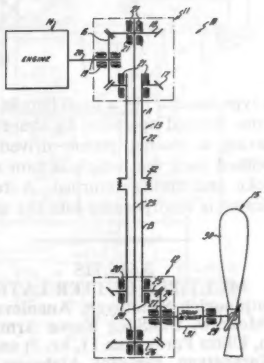
Filed Jan. 2, 1970, Ser. No. 278
Int. Cl. F16g *13/02*
U.S. Cl. 74—245 P **5 Claims**

A flat-link chain, the hinge joints of whose links are formed by support member secured in the end portions of the plates and contacting one another with their outer working surfaces of which one is convex and the other one concave, in which chain the support members with

a concave working surface are made from a polymeric material.

The proposed chain is highly reliable, durable and noise-less in operation when used with sprockets.

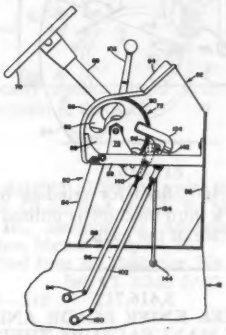
3,616,708
ROTARY POWER TRANSMISSION ASSEMBLY
Charles S. Davis, New York, N.Y., assignor to Curtiss-Wright Corporation
Filed June 10, 1970, Ser. No. 44,918
Int. Cl. F16h *57/00, 37/06*
U.S. Cl. 74—410 **9 Claims**



The rotary power transmission assembly comprises two spaced approximately right-angled gear drives in which one of the drives is constructed and arranged to divide the input torque into two torques and the other drive of similar construction, but arranged to combine the two torques into a single output torque. The two torques are transmitted from one right-angled gear drive to the other by two shafts disposed one within the other to provide a relatively compact assembly. A torsionally flexible coupling is arranged to coact with the shaft of greatest rigidity to provide such shaft with an effective torsional deflection rate substantially equal to the torsional deflection rate of the less rigid shaft. A vibration dampening means is provided to coact with one or more bearings located closest to the point of vibration antinode to minimize resonant vibrations. The torsionally flexible coupling and the vibration dampening means contributing to providing equal loading on the teeth of the meshing gears of the right-angled gear drives and the minimization of fretting corrosion and failure of the gear teeth.

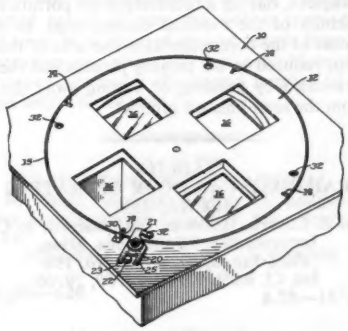
3,616,709
TRANSMISSION CONTROL MECHANISM FOR A TRACTOR HAVING A RESILIENTLY-MOUNTED CONTROL CONSOLE
Donald Irwin Malm, Cedar Falls, Iowa, assignor to Deere & Company, Moline, Ill.
Filed Apr. 14, 1970, Ser. No. 28,327
Int. Cl. G05g *9/00*
U.S. Cl. 74—473 R **5 Claims**

A tractor is provided with an operator's station including a platform, seat, and control console which are secured as a unit to the tractor chassis by resilient mount assemblies which provide vibration isolation and permit limited vertical movement of the operator's station relative to the tractor chassis. A transmission speed and range control mechanism for selectively establishing desired conditions in the transmission is fixed to the control console and includes speed and range selector drums selectively pivotally mounted for rocking about a common axis, which drums have rigid links connected there-



to and to transmission shift elements fixed to the chassis. To prevent the transmission from being shifted due to relative movement between the operator's station and the tractor chassis, a compensator linkage is connected between the chassis and selector drums in such a way as to guarantee that no movement is imparted to the rigid links connecting the selector drums to the transmission shift elements.

3,616,710
MOTION LIMITING DEVICE
John W. Hipelius, Skokie, Ill., assignor to Bell & Howell Company, Chicago, Ill.
Filed Sept. 23, 1969, Ser. No. 860,336
Int. Cl. G05g *5/06*
U.S. Cl. 74—527 **9 Claims**

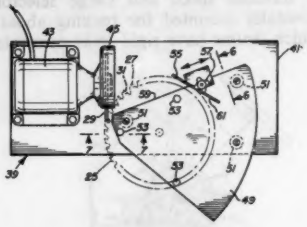


A device that permits unlimited uni-directional sequential relative motion between two bodies but limits reverse relative motion to a single sequence.

3,616,711
METHOD AND MACHINERY FOR SHARPENING THE TEETH OF CIRCULAR SAWS
Bryon G. Daggett, San Diego, Calif., assignor to Noryb Manufacturing, Inc., San Diego, Calif.
Filed Oct. 7, 1969, Ser. No. 864,408
Int. Cl. B31b *1/00*
U.S. Cl. 76—37 **11 Claims**

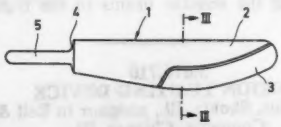
Method and machinery for sharpening teeth of circular saws of the type in which teeth each have a portion which extends further outwardly from the plane of one side of the saw than the next adjacent tooth, and the next adjacent teeth each has a portion which extends outwardly

further from the plane of the opposite side of the saw than the said alternate teeth. One machine is utilized for grinding the cutting faces of the teeth of the saw.



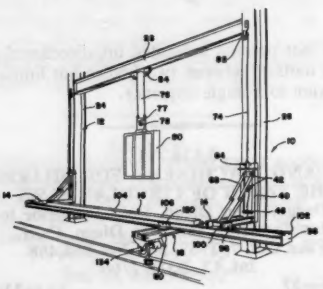
Another machine is utilized for grinding the side faces of the teeth. And a third machine is utilized for grinding the peripheral surface of the teeth.

3,616,712
STAINLESS STEEL KNIFE BLADE AND PROCESS FOR THE MANUFACTURE THEREOF
Rolf-Jurgen Eickhorn, 51 Pfaffenberger Weg, 565 Solingen, Germany
Filed May 18, 1970, Ser. No. 38,329
Claims priority, application Germany, May 21, 1969, P 19 25 846.9
Int. Cl. B21k *11/00*
U.S. Cl. 76—104 R **6 Claims**



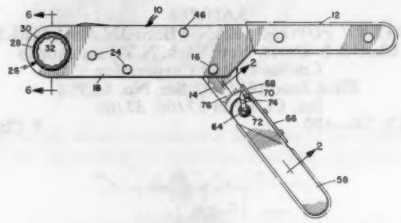
Stainless steel knife blades having improved edge hardness and cutting stability are produced in a multistage process. A semi-finished blade is produced, e.g. by forging a workpiece, having a relatively thick portion of metal in the vicinity of the eventual cutting edge. In this way the hardness of the core material in the area of the cutting edge is not reduced in the forging process and the cutting edge is revealed by grinding or cutting away the surplus metal from the semi-finished product.

3,616,713
RAILROAD CAR DOOR OPERATING MECHANISM
William Z. Crouch, Houston, Tex., assignor to Cargill, Incorporated, Minneapolis, Minn.
Filed Jan. 2, 1970, Ser. No. 198
Int. Cl. B25b *17/00, 21/00, 29/00*
U.S. Cl. 81—57.4 **9 Claims**



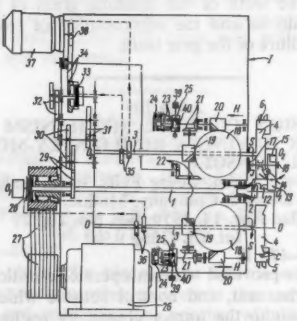
A wall mounted apparatus for power opening and closing of a door of a railroad car including a motor mounted for movement in three mutually perpendicular directions relative to the door of the car. The movement is effected by means of mutually perpendicular tracks and rollers mounted in the tracks. The apparatus retracts when not in use to a storage position along the wall.

3,616,714
RACK AND PINION SQUEEZE ACTION WRENCH
Gerrett W. Gregory, 68 Casselman Place, Chula Vista, Calif. 92010
Filed Aug. 25, 1969, Ser. No. 852,807
Int. Cl. B25b *13/00, 13/46*
U.S. Cl. 81—57.39 **4 Claims**



A socket type wrench has a fixed handle and a movable handle for one handed operation by squeezing, the socket element having a ratchet pinion driven by a sliding, multiple toothed rack bar which is cam actuated in the driving stroke and spring returned. A readily readable torque indicator is incorporated into the movable handle.

3,616,715
MULTIPLE CUTTER LATHE
Grigor Arutjunovich Shaumyan, Ananievsky pereulok 5, kv. 63, Moscow, U.S.S.R.; Karen Armenakovich Ter-Akopyan, Ulitsa Paronyana 11, kv. 5; and Kolya Atanesovich Karapetyan, Pereulok Alabyana 17/14, kv. 16, both of Erevan, U.S.S.R.; Alexandr Ivanovich Lobanov, Ladozihzkaya ulitsa 2/9, kv. 103, Moscow, U.S.S.R.; Petr Mikhailiovich Chernyansky, Ulitsa Gorkogo 1, kv. 9, poselok Zavety Ilicha, Moskovskoi oblasti, U.S.S.R.; Akop Minasovich Epremyan, Ulitsa Erzinkyana 41, Erevan, U.S.S.R.; Sergei Andreevich Savkin, Studencheskaya ulitsa 35, kv. 18, Moscow, U.S.S.R.; Jury Mikhailovich Ermakov, Sovetskaya ulitsa 6, kv. 20, Balashikha Moskovskoi oblasti, U.S.S.R.; Viktor Sergeevich Kiselev, Sadova-Triumfalnaya ulitsa 21, kv. 17 Moscow, U.S.S.R.; and Alexei Yakovlevich Zagorodnikov, deceased, late of Ulitsa Osipenko 58/60, kv. 31, Moscow, U.S.S.R.; by Valentina Fedorovna Zagorodnikova, Alexandr Alexeevich Zagorodnikov, and Elena Alexeevna Zagorodnikova, administrators, all of Ulitsa Osipenko 58/60, kv. 31, Moscow, U.S.S.R.
Filed Oct. 17, 1968, Ser. No. 768,977
Int. Cl. B23b *3/00, 3/28*
U.S. Cl. 82—2 **3 Claims**



A multiple cutter lathe comprises cutters carried by rests operatively connected to respective cam shafts for

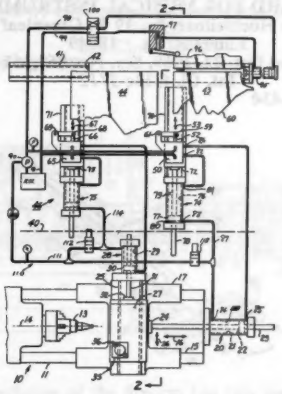
rotation therewith. The cutters are mounted in rows in angular displacement with one another and the cutters of one rest are displaced relative to the row of cutters of the other rests in relation to the centers of rotation of the rests and the drive spindle for a workpiece by an angle smaller than the angular displacement of adjacent cutters. The cutters of the rests thus alternately machine the workpiece in the lathe.

3,616,716

MEANS FOR EXERTING A CONTINUOUS PATH CONTROL FROM A REMOTE LOCATION

Paul J. Weaver, San Marino, Calif., assignor to Automatic Control Systems, Inc., El Monte, Calif.

Filed Oct. 30, 1969, Ser. No. 872,547
Int. Cl. B23b *3/28*; B23c *1/18*
U.S. Cl. 82—14 A **8 Claims**



A control system for controlling the movement of an element such as a cutting tool under continuous path control, the plane of said path relating to two coordinate axes. The device includes a pair of non-parallel working slides and remotely located control slide means for holding a pair of templates which bear positioning information relative to respective coordinate axes. A tracer mechanism is provided to respond to each of the templates, and through a hydraulic link which forms a portion of a power system, to control the respective motion of the working slides, thereby to move the cutting tool along a continuously controlled path. The templates are driven simulaneously, and are of indefinite length so that a plurality of paths representing a plurality of cutting passes can be made with one template for each axis. The controls can be located at a distance from the working element, and the motions may be hydraulically dimensionally amplified, if desired.

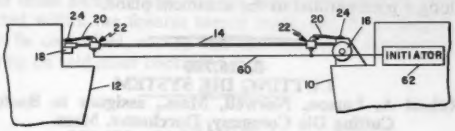
3,616,717

PAIRED CABLE CUTTERS AND METHOD OF USING SAME

James R. Jones, Jr., 2944 Renault Place, San Diego, Calif. 92122

Filed Apr. 16, 1970, Ser. No. 29,175
Int. Cl. B26d *11/00*
U.S. Cl. 83—39 **8 Claims**

Safe parting of a tensioned cable is achieved by simultaneously parting the cable at both ends so that even when the cable has been under high tension it will not whip toward either end. Personnel injury and property damage is thus prevented. One special use is the emergency cutting of cables between ships in re-fueling operations and the like where the operation is normally externally or manually initiated. Another use is in various types of towing procedures. As a variant system operation of the cutters



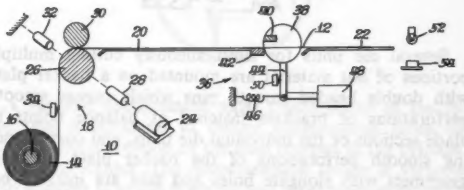
is automatically initiated by a strain responsive device sensing overstrain in the cable.

3,616,718

SHEET SUPPLY APPARATUS

Albert J. Di Giulio and Frank B. Naujokas, Arlington Heights, Ill., assignors to Addressograph-Multigraph Corporation, Mount Prospect, Ill.

Filed June 30, 1969, Ser. No. 837,806
Int. Cl. B26d *5/40*
U.S. Cl. 83—210 **4 Claims**



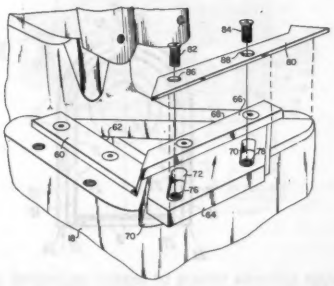
A sheet supply apparatus includes a support for a web of material and a drive means for advancing the web along a path past a web cutting device. The leading edge of the advancing web interrupts a light path between a light source and a light sensitive element. The operation of a continuously adjustable time delay relay is initiated when the light path is broken, and after a predetermined period of time the web is stopped and cut thereby to sever a sheet of desired length from the web. The apparatus can also carry out a multiple sheet supply operation wherein a preselected number of sheets of a desired length is supplied.

3,616,719

NOTCHING SHEET MATERIAL

Robert B. Tassie, South Burlington, Vt., assignor to J. F. Kidder Manufacturing Company, Inc., South Burlington, Vt.

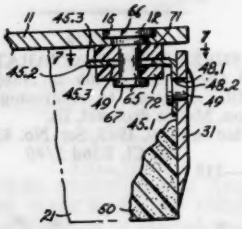
Filed Sept. 25, 1969, Ser. No. 860,989
Int. Cl. B26f *1/12*
U.S. Cl. 83—620 **13 Claims**



Press for notching sheet material with upper and lower blade assemblies each having a pair of blades abutting at

a plane and having respective cutting edges terminating at that plane, each pair including a blade adjustable along a path parallel to the abutment plane.

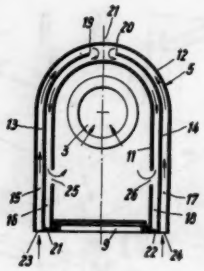
3,616,720
CUTTING DIE SYSTEM
Robert A. Larson, Norwell, Mass., assignor to Boston Cutting Die Company, Dorchester, Mass.
Filed Aug. 20, 1969, Ser. No. 851,675
Int. Cl. B26f *1/44*
U.S. Cl. 83—691 **6 Claims**



Several die units for simultaneously cutting multiple portions of flat material are mounted on a backer plate with double headed smooth pins which engage smooth perforations of brackets fastened at balance points to blade sections of the individual die units, and corresponding smooth perforations of the backer plate. Elastic grommets with elongate holes and tabs are inserted between backer plate and bracket, and between bracket and inner pin head, the outer pin head resting in a counterbore of the free side of the backer plate. The back edge of the blades are distanced from the backer plate.

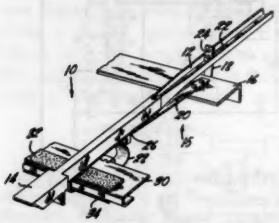
In a modification, a single die unit is fastened to a backer plate with the same type of double headed smooth pins, but only one grommet between bracket and inner pin head and with the back edge of the blade resting on the plate.

3,616,721
WIND GENERATOR FOR MUSICAL INSTRUMENTS, IN PARTICULAR PIPE ORGANS, AND A SOUND DAMPER THEREFOR
Otto Laukhuff, Weikersheim, Germany, assignor to August Laukhuff, Weikersheim, Germany
Filed Feb. 12, 1969, Ser. No. 798,629
Claims priority, application Germany, Feb. 17, 1968, P 16 22 155.9
Int. Cl. G10b *3/02*
U.S. Cl. 84—355 **9 Claims**



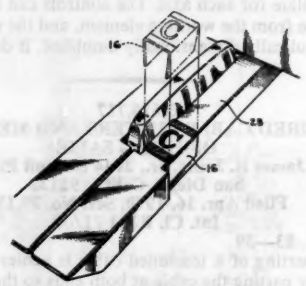
A wind generator for musical instruments particularly pipe organs comprises a sound damper arranged in front of the air intake of the wind generator. The damper comprises a housing the interior of which communicates with the wind generator intake, and the damper itself comprises an air intake which is provided with a flap or similar obturating element, which can be moved from a closed condition under the effect of air flow produced in the damper housing, into a condition in which the damper air intake is uncovered to a greater or lesser extent. The housing wall of the damper has, at least locally, a double-wall construction and defines one or more secondary flow ducts which communicate freely with the atmosphere. The obturating element has a preload acting in the direction of closure which prevents it from opening until a predetermined vacuum level is produced in the interior of the damper housing.

3,616,722
KEYBOARD FOR MUSICAL INSTRUMENTS
Ricardo Hochleitner, Jr., 19 E. Greenleaf St., Emmaus, Pa. 18049
Filed Oct. 22, 1969, Ser. No. 868,361
Int. Cl. G10c *3/12*
U.S. Cl. 84—434 **7 Claims**



A keyboard for musical instruments includes a pair of springs affixed to a key bed and supportably engaging a key. The springs form a flexural pivot and are aligned in planar relation to permit movement of the key in a single plane only. The spring rate is modified by providing a toggle spring affixed at its ends to the key bed and key, respectively.

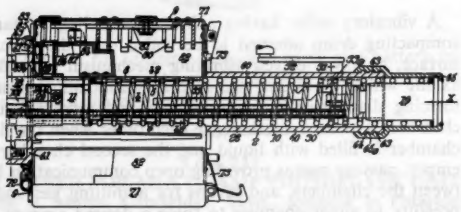
3,616,723
MUSIC SYSTEM WITH CLIPS
Cecil F. Gullickson, 2018 Fosgate Drive, Winter Park, Fla. 32789
Filed Aug. 15, 1969, Ser. No. 850,473
Int. Cl. G09b *15/02*
U.S. Cl. 84—478 **4 Claims**



An arrangement of clips or tabs to be applied to the keyboard of a musical instrument so as to simplify an identification of the keys constituting certain chords, as

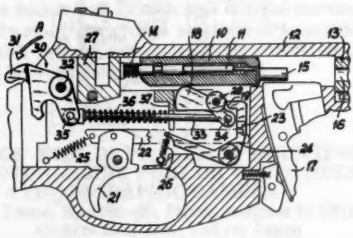
well as identifying individual keys. These clips or tabs may be easily removed when the musician has become familiar with the keyboard, inasmuch as they do not in any way mar the keys. They are not prone to become accidentally displaced. Clips associated with an identification of typical chords may carry a certain code or identification that may be carried over to the sheet music, thus to enable the user to tell at a glance which is the right chord to play in a given instance.

3,616,724
CARTRIDGE FEED MECHANISM FOR A FIREARM
Bernard Maillard, Geneva, Switzerland, assignor to Brevets Aero-Mecaniques S.A., Geneva, Switzerland
Original application Apr. 1, 1968, Ser. No. 714,524, now Patent No. 3,447,418, dated June 3, 1969. Divided and this application Oct. 21, 1968, Ser. No. 810,861
Claims priority, application Luxembourg, July 31, 1967, 54,210
Int. Cl. F41d *9/02*
U.S. Cl. 89—33 SF 7 Claims



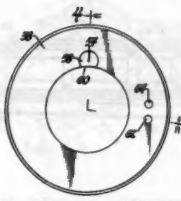
The breechcase of the firearm has two large sides with openings for the cartridges coming alternately from two feed mechanisms on opposite sides of the breechcase. A single motor member in the form of a fork connected to the recoiling part of the firearm reciprocates longitudinally and is of such shape and position that it drives at one time only the driving member of that feed mechanism which is in firing position.

3,616,725
REPEATING FIREARM ACTIONS
Armando Piscetta, 4 Via Alcardo, 20141 Milan, Italy
Filed Feb. 25, 1969, Ser. No. 801,992
Claims priority, application Italy, Feb. 26, 1968, 13,205/68
Int. Cl. F41c *19/14*
U.S. Cl. 89—132 7 Claims



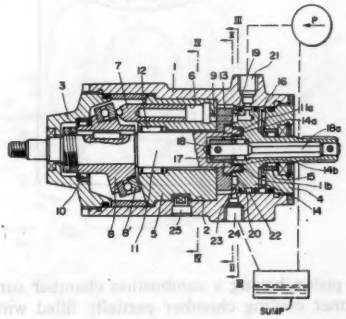
An action mechanism for repeater or semi-automatic firearm such as a small caliber rifle or carbine having a longitudinally sliding breech bolt and an inner or concealed firing pin striking hammer and an outer cocking means linked to said inner hammer whereby, while both said inner hammer and bolt are fully concealed and protected within the firearm breech body, the inner hammer can be controlled, cocked and half-cocked by the user by acting on said outer cocking means.

3,616,726
POWER TRANSMISSION
Dean L. Ruger, Camden, Mich., assignor to Sperry Rand Corporation, Troy, Mich.
Filed Apr. 2, 1970, Ser. No. 25,123
Int. Cl. F04b *1/02*
U.S. Cl. 91—488 4 Claims



A variable displacement axial piston pump of the in-line type is arranged to reduce commutation noise by gradual decompression of the fluid trapped in the cylinder at top dead-center. The decompression means is variable with changes in swash plate tilt and takes place principally through the piston shoes and a bleed hole in the swash plate at small angles of tilt; which bleed hole is progressively closed as the tilt angle increases, allowing decompression to take place through piston motion at larger tilt angles.

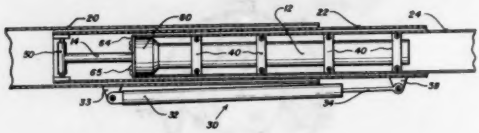
3,616,727
POWER STEERING APPARATUS
Akira Suzuki and Takao Taira, Kariya, Japan, assignors to Toyoda Koki Kabushiki Kaisha, trading as Toyoda Machine Works, Ltd., Kariya, Aichi Prefecture, Japan
Filed June 16, 1969, Ser. No. 833,537
Claims priority, application Japan, June 21, 1968, 43/43,070
Int. Cl. F01b *3/02, 13/04;* F15b *9/10*
U.S. Cl. 91—499 11 Claims



The present invention relates to power steering apparatus, in which a cylinder barrel and a valve plate are relatively rotatable and in surface contact with each other. Either the cylinder barrel or the valve plate, whichever is rotatable relative to the main body of the apparatus, is in rotatable abutment with a valve member which is rotated

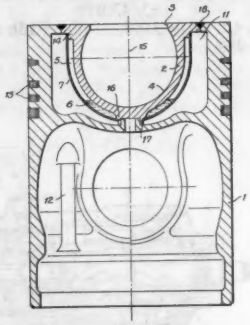
by a steering wheel. Pressure fluid is supplied through this valve member to a cylinder chamber in the cylinder barrel and exhausted through said valve plate from said chamber, thereby pressing a piston in the cylinder chamber against an inclined ring to generate a torque which boosts the steering force.

3,616,728
ACTUATOR MOUNTING ASSEMBLY FOR TELESCOPIC PARTS
Ray L. Kennedy, Excelsior, Minn., assignor to Tel-E-Lect, Inc., Minneapolis, Minn.
Filed Dec. 5, 1969, Ser. No. 882,412
Int. Cl. F01b *7/20*
U.S. Cl. 92—51 **7 Claims**



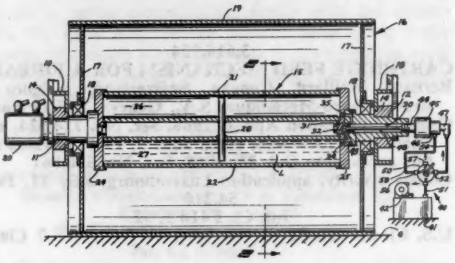
An actuator mounting assembly for telescopic parts in which mounting blocks are positioned around the body of the actuator and at spaced points along the same and rigidly mount the actuator in a telescopic part such that the body of the actuator flexes with the flexure of the telescopic part to maintain alignment of piston and cylinder walls.

3,616,729
PISTON COOLING FOR INTERNAL COMBUSTION ENGINE
Hans Fischer, Nuremberg, Germany, assignor to Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft, Nuremburg, Germany
Filed Dec. 2, 1969, Ser. No. 881,389
Claims priority, application Germany, Dec. 12, 1968, P 18 14 123.6
Int. Cl. F01p *3/06, 3/10*
U.S. Cl. 92—176 **6 Claims**



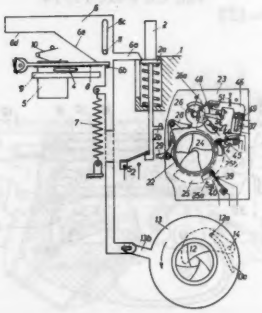
A piston having a combustion chamber surrounded by an inner cooling chamber partially filled with a coolant solid at lower temperatures but melted at the operating temperature for the piston in which the inner cooling spaces are segmented to provide symmetrical disposition of the coolant when the piston is used in a sloping position, and also to provide for use of coolants of different melting points in one or more segments of the inner cooling chamber to compensate for unequal heating of the combustion chamber walls.

3,616,730
VIBRATORY ROLLER
Melvin H. Boone, Fridley, and Brian J. Bush, Spring Lake Park, Minn., assignors to American Hoist & Derrick Company, Minneapolis, Minn.
Filed June 29, 1970, Ser. No. 50,519
Int. Cl. E01c *19/28*
U.S. Cl. 94—50 V **7 Claims**



A vibratory roller having a frame journaling an earth compacting drum adapted to be rolled over the ground surface, a power driven vibrating mechanism journaled axially within the drum, said mechanism including means forming diametrically opposing first and second liquid chambers which counterbalance each other when the first chamber is filled with liquid and the second chamber is empty, passage means providing open communication between the chambers, and means for admitting gas under pressure to either chamber to force a desired amount of liquid from one chamber to the other to selectively destroy said counterbalance and cause the mechanism to vibrate the drum at any desired amplitude or to restore said counterbalance and terminate drum vibration.

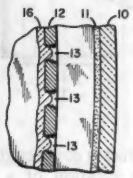
3,616,731
PHOTOGRAPHIC CAMERA HAVING AN APERTURE SETTING SCANNING MECHANISM
Waldemar T. Rentschler, Calmbach, Black Forest, Germany, assignor to Prontor-Werk Alfred Gauthier G.m.b.H., Calmbach, Black Forest, Germany
Continuation of application Ser. No. 644,371, June 7, 1967. This application May 15, 1970, Ser. No. 37,851
Claims priority, application Germany, June 18, 1966, P 39,746
Int. Cl. G03b *7/08, 7/12*
U.S. Cl. 95—10 C **4 Claims**



An aperture setting and shutter timing control device for use in photographic cameras. The device comprises a photosensitive circuit including an exposure meter pointer

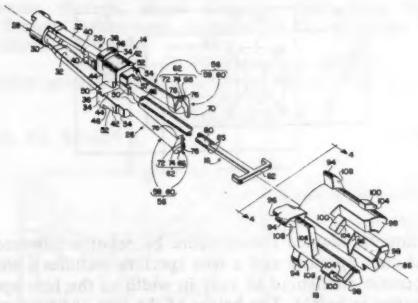
adapted to be clamped into position on the commencement of the exposure sequence and is adapted to be scanned by a mechanical device which sets an appropriate iris diaphragm aperture and, when the diaphragm aperture is at its maximum opening, the exposure time of the shutter is regulated.

3,616,732
APERTURE MASK OPTICAL SYSTEM
Michael E. Rucinski, St. Paul, Minn., assignor to Buckbee-Mears Company, St. Paul, Minn.
Filed Nov. 6, 1969, Ser. No. 874,504
Int. Cl. C23c *17/00*; B44d *1/02*
U.S. Cl. 95—1 R **6 Claims**



A method for utilizing a shadow mask as a pattern for laying down a phosphorus dot pattern without affecting the physical characteristics of the mask.

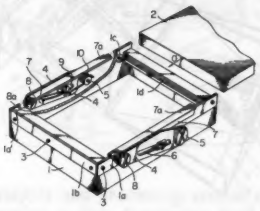
3,616,733
RETAINER FOR MULTILAMP PHOTOFLASH UNIT
John B. Morse, Cambridge, Mass., assignor to Polaroid Corporation, Cambridge, Mass.
Filed July 1, 1969, Ser. No. 838,211
Int. Cl. G03b *9/70*; H01r *13/54*
U.S. Cl. 95—11 R **20 Claims**



Apparatus for releasably mounting a multilamp photoflash unit including a plurality of resilient prongs adapted to have a hollow post of such unit inserted thereon. Adjacent surfaces of the prongs are formed to provide contours which prevent insertions of any portion of the hollow post between the prongs.

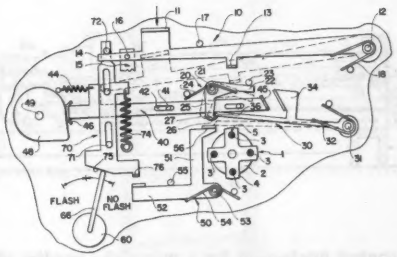
3,616,734
DEVICE FOR DETACHABLY MOUNTING A PHOTOGRAPHIC FILM OR PLATE HOLDER ON A PHOTOGRAPHIC CAMERA
Yasuo Inoue, Konosu-shi, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan
Filed Jan. 20, 1970, Ser. No. 4,312
Claims priority, application Japan, Jan. 23, 1969, 44/4,988
Int. Cl. G03b *19/00, 27/58*
U.S. Cl. 95—11 **4 Claims**

Device for detachably mounting a photographic film or plate holder on an exposure window frame of a photographic camera comprising a pair of first levers each pivotally mounted at its one end on the respective opposite side of the window frame, a pair of second levers each pivotally connected at its one end to the other end of each of the first levers and a pair of springs each secured at its one end to each of the second levers and at its other end to a stationary portion of the camera so that the second levers are urged toward the window frame. The second levers are provided with longitudinal bent edge portions, respectively, adapted to engage with the holder mounted on the window frame



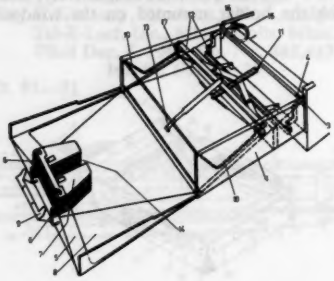
so that the holder is held on the window frame. The first and second levers are formed with longitudinal elongated holes, respectively. A manually operable stud member is slidably fitted in the hole of the first lever as well as in the hole of the second lever pivotally connected to the first lever so that the second lever is urged toward the window frame to hold the holder on the window frame when the stud members are moved in one direction while the holder is released from the window frame when the stud members are moved in the opposite direction.

3,616,735
BLOCKING MECHANISM FOR USE WITH PHOTOGRAPHIC APPARATUS TO AUTOMATICALLY CONTROL FLASH IN RESPONSE TO SCENE BRIGHTNESS
Richard J. Bresson, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Continuation of application Ser. No. 767,099, Oct. 14, 1968. This application Aug. 12, 1970, Ser. No. 63,250
Int. Cl. G03b *9/70, 15/04*
U.S. Cl. 95—11.5 **11 Claims**



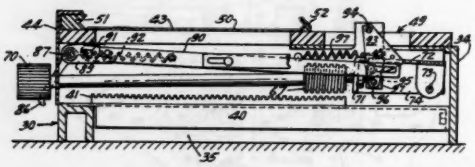
A mechanism is provided which automatically controls the position of a blocking member with respect to the path of movement of an actuator for a percussion-ignitable flash lamp or other flash lamp ignitable by striking. The control is responsive to scene light conditions and to the operation of the shutter release lever of a camera.

3,616,736
DEVICE SUPPLYING FILM SHEETS TO A FILM EXCHANGER
Lennart S. E. Bergstrom, Solna, Sweden, assignor to Siemens Aktiengesellschaft, Erlangen, Germany
Filed Dec. 29, 1969, Ser. No. 888,536
Claims priority, application Sweden, Jan. 15, 1969, 501/69
Int. Cl. G03b 19/10
U.S. Cl. 95—19 2 Claims



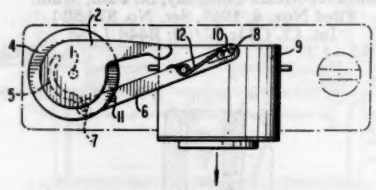
A device for the magazine which transmits film to a film exchanger is characterized in that the magazine is provided with a film holder wherein separate film sheets are held by spring pressure between discs forming a pile. An arm actuated by the film exchanger has a claw penetrating into a recess of the disc pile in such manner that the claw engages a film sheet at its rear edge and pulls it out through a slit in the magazine in the direction of the illuminated field of the film exchanger. Guides are located in the magazine at opposed side edges of the film sheets. These guides hold down the sheet edges and impart to the film sheets a curved shape and greater stability.

3,616,737
MICROFICHE HANDLER WITH FREE FLOATING AND VERNIER-TYPE MOVEMENT OF SUPPORT FRAME
Floyd L. Foslien, East Oakdale, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Filed Dec. 23, 1968, Ser. No. 786,073
Int. Cl. G03b 21/11
U.S. Cl. 95—37 5 Claims



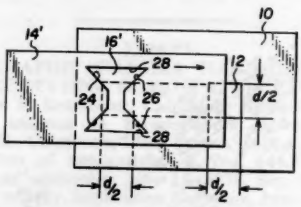
A control mechanism for a microfiche handler affording selectively free-floating movement and a vernier-type movement of a frame supporting a microfiche relative to the optical system of a reader and/or printer. The control mechanism utilizes systems of interlocking gears, including rotatable driving gears on one frame, which gears are separated from their cooperating gears to achieve the free-floating movement and which are biased independently into driving engagement for vernier-type adjustment.

3,616,738
CAMERA WITH A RETRACTABLE LENS BARREL
Susumu Fujita, Nishinomiya-shi, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan
Filed Dec. 5, 1969, Ser. No. 882,796
Claims priority, application Japan, Dec. 6, 1968, 43/89,700
Int. Cl. G03b 17/04
U.S. Cl. 95—39 3 Claims



A retractable lens barrel is connected with a lever which is turned according to rotation of a cam. The cam is actuated by operating the film wind-up lever.

3,616,739
CAMERA HAVING SHUTTER SPEED CONTROLLED BY LENS APERTURE
Allen G. Stimson, Rochester, and Loren J. Craig, Springwater, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.
Filed July 7, 1969, Ser. No. 839,593
Int. Cl. G03b 9/24
U.S. Cl. 95—55 5 Claims

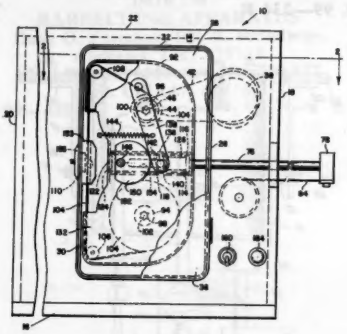


A camera adapted for exposure by relative movement of a shutter aperture and a lens aperture includes a shutter aperture configured to vary in width as the lens aperture varies in height. The height of the lens aperture may be varied by a masked single vane or a Waterhouse-stop wheel. The shutter aperture may be shaped with converging sides or may have an opaque mask in the center with spaced transparent openings.

3,616,740
SYSTEM AND METHOD FOR PROCESSING A STRIP OF EXPOSED PHOTOGRAPHIC MATERIAL
Vaito K. Eloranta, Needham, Mass., assignor to Polaroid Corporation, Cambridge, Mass.
Filed Jan. 13, 1969, Ser. No. 790,553
Int. Cl. G03d 5/00
U.S. Cl. 95—89 R 13 Claims

A motion picture film processing system and method employing an applicator in which processing fluid is initially stored and having a doctor blade formed at one end thereof. The applicator also includes a plunger slidably mounted on the opposite side of the processing fluid

from the doctor blade so that displacement of the plunger inwardly of the applicator causes the processing fluid to be expressed from the applicator across its doctor blade. An exposed strip of film is initially coiled around a supply reel with a leader extending to a takeup reel and, in passing from the supply reel to the takeup reel, the film is drawn across the doctor blade. A cam, which controls the displacement of the plunger within the applicator, is connected to the takeup reel to make substantially one complete revolution during the time that the takeup reel has made the number of revolutions required to draw the entire exposed film strip across the doctor blade. Additionally, a variable resistor in series with the processors motor varies the speed of the motor to impart a substantially constant speed of the film strip as it passes across the doctor blade.

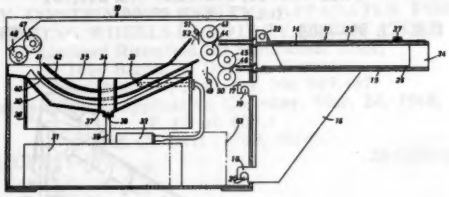


3,616,741

APPARATUS FOR USE IN DIFFUSION TRANSFER COPYING

Renato Simioni, Hans Kappeler, and Hans Waller, Zurich, Switzerland, assignors to Gevaert-Agfa N.V., Mortsel, Belgium

Filed Mar. 17, 1969, Ser. No. 807,717
Claims priority, application Great Britain, Apr. 26, 1968, 19,889/68
Int. Cl. G03d *9/00*
U.S. Cl. 95—89 L **7 Claims**



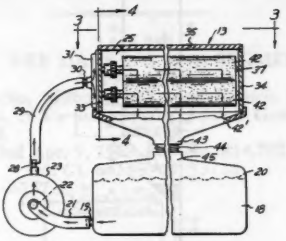
A copying apparatus for use in silver complex diffusion transfer copying and the like wherein the leading edges of sheet material processed within such apparatus are precisely adjusted relative to one another in a variable or adjustable way. The sheets are separately fed by separate independently operable feeding rolls, the feeding of which is stopped when the leading edge of each sheet reaches a sensing means disposed at a predetermined point between the feeding rolls and the processing zone. The sensing means for the second sheet reinitiates the feeding of the first sheet and activates a time-delay device which, after a variable pre-set period of delay, reinitiates the feeding of the second sheet so that the sheets arrive at the processing zone with their leading edges in precisely determined, spaced-apart relation which can be adjusted as desired.

3,616,742

POROUS ROLLER FILM TRANSPORT AND PROCESSING SYSTEM

Clifford J. Boyle and Richard B. Belanger, Detroit, Mich., assignors of fractional part interest to DuWayne E. Gilkey, Berkley, Mich.

Filed Mar. 25, 1969, Ser. No. 810,105
Int. Cl. G03d *3/00*
U.S. Cl. 95—89 R **4 Claims**



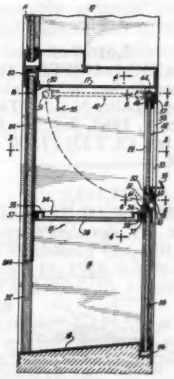
A film transport and processing system which includes a tank containing a film developing fluid, a film fixing solution or water and a housing overlying the tank in communication therewith, a series of vertically spaced pairs of film receiving roller assemblies within the housing for passing a film through the housing for application thereto of the processing fluid, together with a pump and manifold for continuously circulating the tank fluid to the roller assemblies, the roller assemblies including an inner perforated support tube mounted on the housing, a perforated power rotated outer tube journalled upon the inner tube, and a resilient porous plastic film engaging roller mounted upon the outer tube.

3,616,743

VENTILATOR STRUCTURE

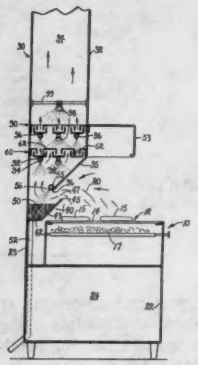
Vladimir Alter, Newmarket, Ontario, Canada, assignor to American Metal Climax, Inc., New York, N.Y.

Continuation of application Ser. No. 729,269, May 15, 1968. This application Mar. 5, 1970, Ser. No. 15,315
Int. Cl. E06b *7/02*
U.S. Cl. 98—99 **18 Claims**



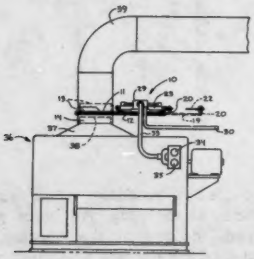
There is provided a ventilator structure including a frame that defines an opening. An outer panel extends downwardly from the top of the opening, terminating above the bottom of the opening. An inner panel extends upwardly from the bottom of the opening, terminating below the top of the opening and above the bottom edge of the outer panel. A transverse, generally horizontally positioned screen extends between the two panels.

3,616,744
AIR CLEANSING SYSTEM FOR COOKING RANGES
Donald D. Jensen, 3604 E. Butler Ave., Fresno, Calif. 93721
Filed Aug. 21, 1969, Ser. No. 852,026
Int. Cl. F23j *11/02*
U.S. Cl. 98—115 K 6 Claims



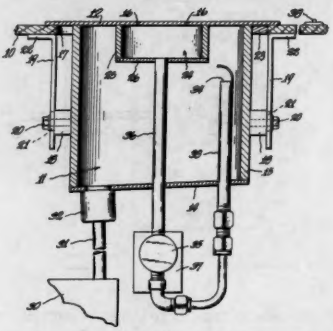
An air cleansing system, for cooking ranges and the like, adapted to remove heat and contaminants such as grease-laden fumes generated from the heating surfaces of such ranges, providing an exhaust duct extended from a position adjacent to said heating surface at which it has an intake opening to a remote exhaust opening, said duct having a constricted portion near the heating surface, means for drawing fumes in the intake opening for discharge from the exhaust opening, a spray bath located at the constricted portion of the duct, and a pan disposed below the bath to collect spray therefrom together with contaminants dissolved therein. The stream of air generated through the duct is cleansed by the washing action of the spray bath, the cooling effect thereof resulting in condensation of volatile contaminants, and by successive humidification and dehumidification of the stream. The invention also has to do with a unique form of trap having particularly significant utilization in the system.

3,616,745
AUTOMATIC DAMPER CONTROL
James C. Russell, Sr., 703 Pennington Ave., Thomasville, N.C. 27360
Filed Oct. 1, 1969, Ser. No. 862,882
Int. Cl. F23j *11/00*
U.S. Cl. 98—115 R 2 Claims



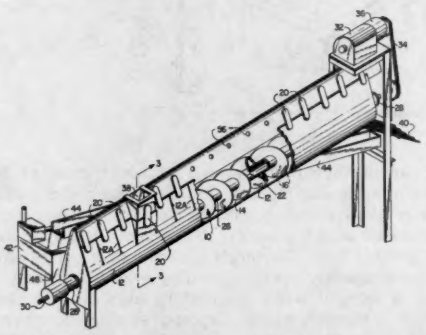
In abstract, a preferred embodiment of this invention is an automatic damper control to open suction lines that remove chips, dust and other debris during operation of wood working type machines and to close the suction lines when the machine is shut down.

3,616,746
FOOD HEATING APPARATUS
Robert H. Sliwoski, Rankin, Pa., assignor to Emerson Electric Co., St. Louis, Mo.
Filed July 15, 1970, Ser. No. 55,107
Int. Cl. B01j *3/00*
U.S. Cl. 99—234 R 7 Claims



Food heating apparatus, particularly for warming and freshening rolls and buns, comprising a plate on which the food product is placed, the plate forming the top of a main steam chamber. A dry steam chamber, within the main steam chamber, receives steam from the latter, the steam from the dry steam chamber issuing from through apertures in the top plate to warm the food products thereon. The dry steam chamber is considerably smaller than the main chamber so that steam within the latter maintains the top plate in heated condition.

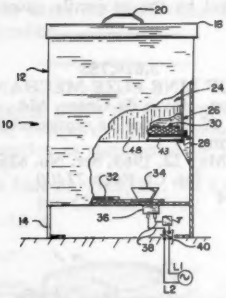
3,616,747
ARCHIMEDEAN SCREW TYPE COOKER CONVEYOR
James M. Lapeyre, New Orleans, La., assignor to Laitram International, Inc., New Orleans, La.
Filed Mar. 26, 1969, Ser. No. 810,701
Int. Cl. A47j *35/00*
U.S. Cl. 99—405 3 Claims



This disclosure relates to a cooker conveyor and method of cooking therewith in which a hollow Archimedean screw has a flexible and/or resilient blanket wrapped about it in water tight seal therewith and in which a heating fluid such as steam is passed through the screw to heat a conveying medium such as water into which the product to be cooked is introduced. As the screw rotates, the

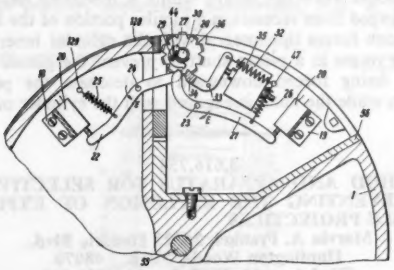
product to be cooked and the conveying medium are advanced along the length of the screw in discrete pockets of liquid conveying medium which is elevated to cooking temperature by the heating fluid passed through the hollow flights of the Archimedean screw. The axis of the screw may be horizontal, inclined or declined due to the water tight seal between the flights of the screw and the flexible blanket wrapped thereabout.

3,616,748
BARBECUING APPARATUS
Dave O. Foreman, 606 E. Broadway, Andrews, Tex. 79714
Filed Oct. 25, 1968, Ser. No. 770,757
Int. Cl. A47j *43/18*
U.S. Cl. 99—450 5 Claims



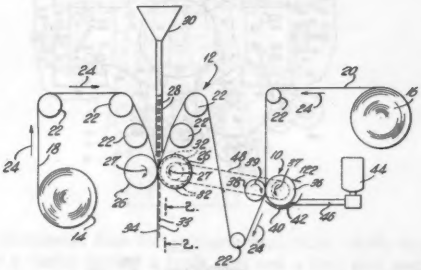
A barbecue apparatus which includes an enclosure supported by legs with a heating element located in the bottom of the enclosure and a lid telescopingly received at the top. A removable food chamber is supported clear of the walls and provided with a grill means which is spaced apart from the bottom of the food chamber. The bottom of the food chamber is in the form of a dead air space. Food, when placed on the grill, may be completely and uniformly cooked without further disturbance and in a minimum amount of time.

3,616,749
KEY CONTROLLED SETTING APPARATUS FOR PRINTING WHEELS IN ROTARY DUPLICATORS
Gerhard Ritzerfeld, 14 Schorlemer Allee, 1000 Berlin, 33 Dahlem, Germany
Filed Mar. 20, 1969, Ser. No. 809,487
Claims priority, application Germany, Mar. 25, 1968, P 17 61 035.4
Int. Cl. B41l *11/08, 47/46*
U.S. Cl. 101—91 25 Claims



A printing mechanism including an ordinal series of digital printing wheels is set to selected digital positions by an electric control circuit including an ordinal series of digital sets of manually operated key switches. After actuation of a key switch for each printing wheel, a start switch is operated whereupon the printing wheels are automatically set to the selected printing position. The mechanism is built into a cavity of a printing cylinder so that a copy sheet imprinted by the same is also imprinted by the printing wheels. It is also possible to arrange the printing wheels in the path of movement of a copy sheet imprinted in a printing machine, and to use the printing wheels to print additional information on the copy sheet.

3,616,750
ROTARY WEB MARKING AND SEGMENTING APPARATUS
Ira S. Gottscho, Milburn, N.J., and Francis C. Worth, Ridgewood, N.Y., assignors to Adolph Gottscho Inc., Union, N.J.
Filed Apr. 9, 1969, Ser. No. 814,752
Int. Cl. B41f *9/00, 13/56*
U.S. Cl. 101—157 7 Claims

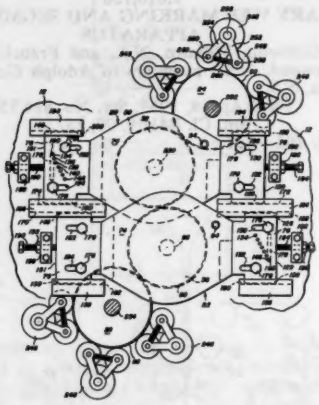


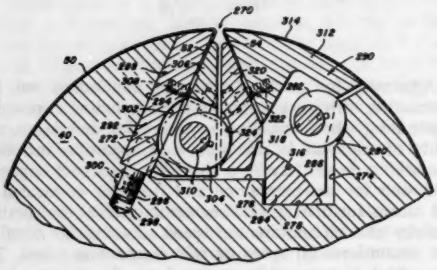
Apparatus for marking a moving continuous web for connection with a segmenting system including a rotatable segmenting wheel engaging said web for defining a plurality of segments in said web, said apparatus including a marking means having a rotatable die wheel engaging said web for marking same and operably connected to the means for driving said segmenting wheel for rotation thereby at a circumferential speed substantially equal to the circumferential speed of said segmenting wheel. The die wheel is removably mounted on the frame of the marking means for substitution of a die wheel selected from a group of die wheels of different diameters, adjustment means being provided for laterally displacing the impression roller, well and doctor means of said marking means relative to the longitudinal axis of said die wheel to accommodate said die wheels.

3,616,751
VARIABLE CUT-OFF WEB PERFECTING PRESS
Harry E. Mowry, Pittsburgh, Pa., assignor to Miller Printing Machinery Co., Pittsburgh, Pa.
Filed Nov. 19, 1968, Ser. No. 777,017
Int. Cl. B41f *7/12, 13/44, 27/06*
U.S. Cl. 101—220 15 Claims

A web fed perfecting press for printing offset images of different size on the printed web. Both the top and bottom plate cylinders are journaled in a press frame for rotation about fixed axes. The top and bottom blanket cylinders are journaled in auxiliary frames that are supported by the main frame. The auxiliary frames are adjustable horizontally on the main frame to move the blanket cylinders toward and away from each other and toward and away from the fixed plate cylinders. Both of the blanket cylinders are mounted in eccentric bearings for vertical adjustment within the auxiliary frames so that the blanket cylinders are also adjustable vertically relative

to each other. The plate and blanket cylinders are arranged to have annular plates of different circumferences mounted thereon with different sized annular filler shims between the cylinders and the plates. The various sized plates and filler shims provide different lengths for the printed offset images on the printed web. The drive gearing and bearers for the pairs of plate and blanket cylinders include idler gears and idler bearers suitably mounted to drive the plate and blanket cylinders of different diameters. To change the diameter of the plate and blanket





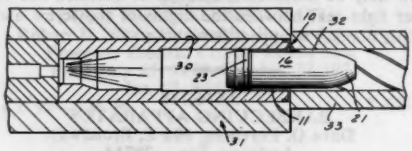
cylinders, the annular plates and annular shims are removed from the cylinders and other preferably preregistered plates and annular shims are positioned on the cylinders within the press to change the circumferential dimension of the plate and blanket cylinders. The auxiliary frames are adjusted horizontally and the blanket cylinders are adjusted vertically to move the periphery of the blanket cylinders into abutting relation with the plate cylinders and into abutting relation with each other for perfecting printing on both sides of the web.

3,616,752
PROJECTILE GUIDE FOR TELESCOPED AMMUNITION

William E. Lahey, Oak Harbor, and Duane A. Somers and Edward S. Daniels, Port Clinton, Ohio, assignors to TRW Inc., Cleveland, Ohio

Filed Jan. 30, 1969, Ser. No. 795,206
Int. Cl. F42b *5/18, 9/16, 31/00*
U.S. Cl. 102—38 **7 Claims**

A J-shaped cross section plastic guide for telescoped projectile ammunition, especially of the caseless type. A cylindrical portion of the guide extends into the central bore of the ammunition round and defines the front end thereof; the bight portion of the J-shaped cross section overlies the annular ring front end of the round with the short leg of the J defining a portion of the outer diameter of the round. The cylindrical portion of the guide is designed to be stripped from the remainder thereof by

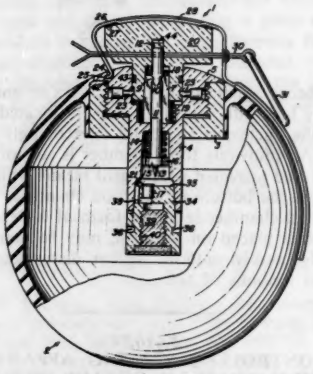


the projectile during firing and carried out of the weapon through the barrel thereof. The remainder of the guide is either consumed during firing or broken up and forced through the barrel by the projectile gases.

3,616,753
OUT OF LINE FUZE MECHANISM

Melvin J. Carlson, Havre de Grace, Md., assignor to the United States of America as represented by the Secretary of the Army

Filed May 22, 1969, Ser. No. 826,841
Int. Cl. F42b *27/00*
U.S. Cl. 102—64 **12 Claims**



A fuze to detonate the payload within a munition wherein the striker point to detonate the primer means is out of line with the primer means when the munition is stored, shipped, or handled and is brought in line by rotating an actuating knob in a clockwise direction; the actuating knob being under spring tension and forced off of a cylinder means when pin means within a mounting head are disengaged from recesses in a tubular portion of the knob; the knob forces lips integral with the cylinder inner wall into a recess in a piston shaft to prevent the piston shaft from being forced downward to detonate the primer means while the knob is engaged with the cylinder means.

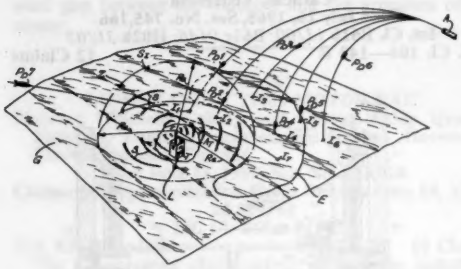
3,616,754
METHOD AND APPARATUS FOR SELECTIVELY PREVENTING THE EXPLOSION OF EXPLODABLE PROJECTILES

Marvin A. Frenkel, 26323 Hendrie Blvd., Huntington Woods, Mich. 48070

Filed Aug. 10, 1967, Ser. No. 659,688
Int. Cl. F42c *13/04, 15/40, 19/12*
U.S. Cl. 102—70.2 R **16 Claims**

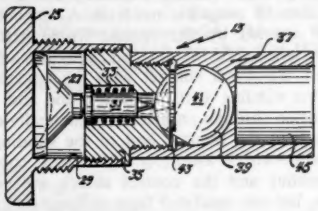
Providing about a location to be protected a wireless signal having a predetermined intensity at a given range

from said location, and detecting said signal of predetermined intensity so as to prevent explosion of friendly



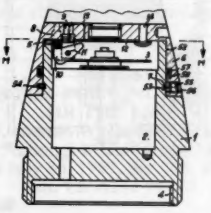
projectiles in the event the latter come within said given range of said location.

3,616,755
ALL ANGLE BASE DETONATING FUZE
Dale M. Davis, Freeport, Fla., assignor to the United States of America as represented by the Secretary of the Air Force
Filed June 11, 1969, Ser. No. 832,112
Int. Cl. F42c *15/22*
U.S. Cl. 102—73 A **4 Claims**



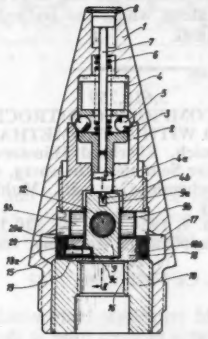
A base detonating fuze for use with a high explosive shell including an inertia weight striker having unique spherical surfaces in loose contact with the bore of the base plus such that the mass centroid of the striker is noticeably forward of its contact area. Oblique angular contact of the shell with the target produces an inertial torque couple and causes a forward "roll" of the striker thereby contacting the firing pin in exact center and applying the required axial thrust thereto.

3,616,756
TIME FUZE FOR PROJECTILES
Robert Simmen and Francis Liengme, Geneva, Switzerland, assignors to Mefina S.A., Fribourg, Switzerland
Filed Feb. 24, 1969, Ser. No. 801,705
Claims priority, application Switzerland, Apr. 4, 1968, 5,013/68
Int. Cl. F42c *9/02, 15/34, 15/04*
U.S. Cl. 102—76 **11 Claims**



Two separate trains of safety elements, one being an inertial safety mechanism that releases the clockwork only when the projectile is accelerated, each prevents the primer charge from being moved into alignment with the firing pin until the projectile is accelerated and, in the case of the non-inertial train, until the clockwork runs.

3,616,757
IMPACT FUSE FOR A SPINNING PROJECTILE
Fritz Berger, Dusseldorf, Germany, assignor to Firma Rheinmetall G.m.b.H., Dusseldorf, Germany
Filed July 5, 1968, Ser. No. 742,592
Claims priority, application Germany, July 5, 1967, P 15 78 502.1
The portion of the term of the patent subsequent to Nov. 21, 1984, has been disclaimed
Int. Cl. F42c *15/22, 15/26*
U.S. Cl. 102—79 **8 Claims**

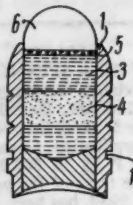


A percussion fuse for spinning projectiles which comprises a casing having a front part and a rear part and a sleeve secured in the rear part of the casing and having a bearing surface. A ball carrier with balls is mounted slidably in the casing and in the sleeve and has a striker pin thereon. A fuse body is secured in the rear part of the casing and spaced on the sleeve. A rotor is mounted to rotate between the fuse body and the sleeve and has a coiled band around the rotor and has a percussion cap therein. A fuse plunger is slidably mounted in the casing and extends into the sleeve. The rotor is normally held in inoperative position by the coiled band and when the projectile is fired a centrifugal spinning force will act on the band to hold the rotor in an unarmed position for a predetermined period of time, so that when the balls in the ball carrier force the latter away from the rotor, the striker pin will be in position to plunge into the percussion cap when the projectile strikes a target. The coiled band surrounds at a distance the rotor in its inoperative position, and a locking pin is disposed radially and bridging the distance engaging the inner coil layer of the coiled band and entering a recess of the rotor such, that the release and erection of the latter is possible only, when the innermost coil layer has expanded at least for the amount of depth of penetration of the locking pin into the recess.

3,616,758
SHELL FOR THE IMMOBILIZATION OF ANIMALS
Vladil Afanasievich Komarov, St. Grafskaya Voronezhsky gosudarstvenny zapovednik, Voronezhskaya obl., U.S.S.R.
Filed Oct. 24, 1968, Ser. No. 770,216
Int. Cl. F42b *11/30*
U.S. Cl. 102—92 **19 Claims**

A shell for the immobilization of animals comprises a hollow body having opposite ends one of which is open and the other of which is closed. A ballistic head is seated in the open end of the hollow body and an immobilizing substance is contained in the hollow body. A sealing layer of fat is interposed between the ballistic head and the

immobilizing substance to prevent the immobilizing substance from being exposed to the atmosphere should there be a leak in the hermetic sealing of the ballistic



head in the hollow body. A plurality of guide grooves are provided on the exterior of the hollow body in intersecting relation along which the body deforms upon impact with an animal.

3,616,759
PROPELLANT COMPRISING NITROCELLULOSE BONDED WITH NITROMETHANE

Rudolf Meyr, Munich, Eberhard Häussermann, Waldkraiburg, and Peter Semmler, Ebersberg, Germany, assignors to Nitrochemie G.m.b.H., Muhldorf, Upper Bavaria, Germany

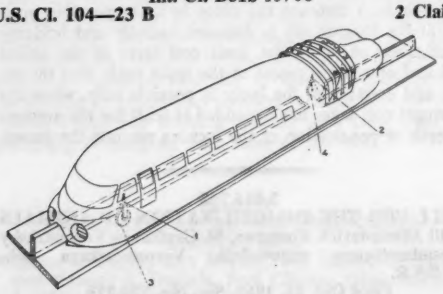
Filed Jan. 7, 1966, Ser. No. 520,302
Claims priority, application Germany, Jan. 7, 1965, N 26,044
Int. Cl. F42b *1/00, 1/02*
U.S. Cl. 102—100 **8 Claims**

A composite solid propellant body which upon combustion will not form a pressure drop in the zone of adhesion between the individual bodies of the composite body, consisting of a plurality of solid propellant bodies, each of which consists of an explosive composition based on the combination of nitrocellulose and polyalcohol nitrate and which individual bodies are adhered to each other by means of nitromethane as the sole or essential constituent of an adhesive material.

3,616,760
AUXILIARY PROPULSION FOR AIR-CUSHION VEHICLES

Rene Lucien, Neuilly-sur-Seine, Pierre Marie Ghobert, Paris, and Yves Andre Pascal, Montrouge, France, assignors to Societe Messier and Societe de l'Aerotrain, both of Paris, France

Filed Dec. 3, 1969, Ser. No. 881,726
Claims priority, application France, Dec. 3, 1968, 176,464
Int. Cl. B61b *13/08*
U.S. Cl. 104—23 B **2 Claims**

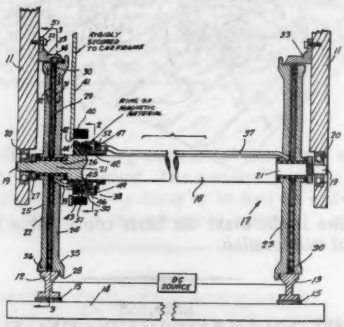


An air cushion vehicle including a ground-effect propulsion system consisting of a main propulsion system and an auxiliary propulsion system usable during certain operating conditions of the vehicle over portions of the vehicle track. The auxiliary propulsion system is constituted of one or more retractable wheels actuated by a hydraulic system and is intended for use below a predetermined vehicular transition speed.

3,616,761
HOMOPOLAR LOCOMOTIVE RAILWAY

Alberto Serra Valls, Apartado 1827, Caracas, Venezuela

Filed July 16, 1968, Ser. No. 745,166
Int. Cl. B61b *13/00;* **B61c** *9/46;* **H02k** *31/02*
U.S. Cl. 104—148 R **12 Claims**

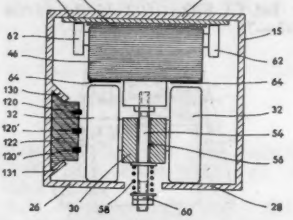


A direct current propulsion system for homopolar electric locomotive railways wherein driving current is delivered to self-contained motor-wheel assemblies through the track rails. Each motor-wheel assembly consists of a spiral homo-polar winding mounted between a pair of circular discs of magnetic material. A magnetic housing member carried by the vehicle frame extends adjacent the peripheries of the discs and provides a flux path therebetween. Electrical contact with the associated rail is made to the winding at its peripheral end and its inner end is connected through an electromagnetically-operated control switch to the internal end of the winding of the opposite motor-wheel assembly. The two cooperating wheel assemblies and the control switch are coaxially-mounted on, but are insulated from a common axle. The switch control winding is rigidly-secured to the vehicle frame surrounding a pair of concentric arcuate contact segments secured on and insulated from the axle. A bridging ring is drawn into conductive engagement with the segments responsive to the energization of the control winding.

3,616,762
OVERHEAD CONVEYOR SYSTEM

Jean-René Benner, Courtry, France, assignor to Linerail, manutention par moteur lineaire, Neuilly, France

Filed Sept. 16, 1969, Ser. No. 858,272
Claims priority, application France, Sept. 25, 1968, 167,424; Oct. 17, 1968, 170,196; Apr. 15, 1969, 6910168
Int. Cl. B60l *9/18, 13/00*
U.S. Cl. 104—148 LM **6 Claims**



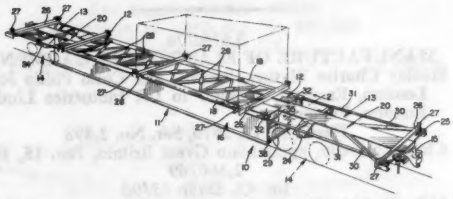
Overhead conveyor system with self-propelled truck driven by an electrical linear induction motor along an overhead track of rectangular box-like section with a lon-

gitudinal slot in the bottom wall. The top wall of the track forms the armature of the linear motor and the inductor is borne by the truck. Positioning rollers provide a constant gap between the inductor and the armature of the motor.

3,616,763
LINEAR INDUCTION MOTOR RAIL
Norman Whitfield Colling and George Philip Quayle, Fulwood, England, assignors to Tracked Hovercraft Limited, London, England
Filed June 13, 1969, Ser. No. 833,026
Claims priority, application Great Britain, June 14, 1968, 28,379/68
Int. Cl. B60m *1/30*
U.S. Cl. 104—148 **10 Claims**

The thrust speed characteristic of a linear induction motor is varied by varying the composition of the linear motor rail. The rail can have an initial length of low resistivity, such as aluminium, to produce a low starting thrust followed by a length of progressively increasing resistivity to produce a progressively increasing thrust, followed by a length of high resistivity, such as manganese steel alloy. There may be a final length of lower resistivity again, such as aluminium for high speed operation.

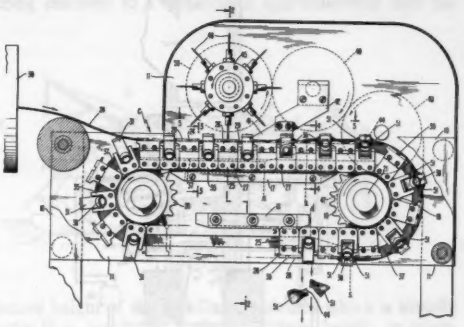
3,616,764
LIGHTWEIGHT RAILWAY CONTAINER CAR
Kent N. Johnson, South Holland, John H. Spence, Chicago Heights, and Ray L. Ferris, Thornton, Ill., assignors to Pullman Incorporated, Chicago, Ill.
Filed July 7, 1969, Ser. No. 839,351
Int. Cl. B60p *7/10;* **B65j** *1/22*
U.S. Cl. 105—366 **15 Claims**



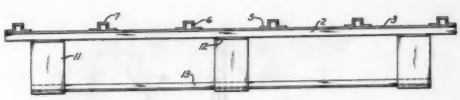
A railway car of lightweight design consisting of an intermediate frame structure, which includes a pair of laterally spaced side sills of I-beam construction having a substantial depth, has connected at opposite ends thereof transition structures of boxlike design. The intermediate structure supports between the longitudinal side sills end frame structures each of which includes a section of boxlike center sill projecting outwardly from the transition structures providing structural supports for said center sills. The end frame structures are also provided with cross members providing sill platforms which support container brackets. Additional container brackets are supported on the side sills of the intermediate structure.

3,616,765
APPARATUS FOR FORMING FOOD PRODUCTS OR THE LIKE
Arthur J. Griner, Wyckoff, N.J., assignor to National Biscuit Company
Filed July 16, 1969, Ser. No. 842,170
Int. Cl. A21c *11/10*
U.S. Cl. 107—69 **11 Claims**

Apparatus which continuously conveys a flexible, ribbon-like strip of edible material, such as gelatinized dough, including sections severed from the leading end thereof, bends the advancing ribbon or sections along or near the longitudinal center line thereof to form folds centrally of such sections and presses the sides of the folds together, transversely severs the strip between successive folds and at the center of each fold to thereby form scoop-like articles each having a finger grip portion at one end and a transversely bowed portion at the other end.



3,616,766
METAL PALLET
Maurice A. Weiss, Steubenville, Ohio, assignor to Follansbee Steel Corporation, Follansbee, W. Va.
Filed Sept. 23, 1969, Ser. No. 860,324
Int. Cl. B65d *19/18*
U.S. Cl. 108—51 **6 Claims**

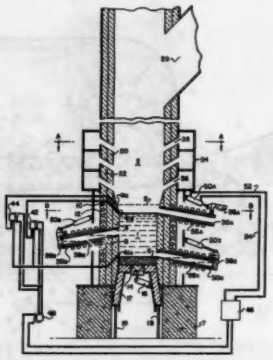


Several spaced parallel sheet metal channels are arranged in two rows, one on top of the other. The upper row is welded to the lower row. Each channel in the lower row has a flat bottom, and upstanding side walls with laterally projecting flanges along their upper edges supporting and welded to the channels in the upper row, which are inverted. The channels are supported by a number of sheet metal feet, each of which has a bottom, and upwardly diverging side walls with laterally projecting flanges along their upper edges welded to the bottoms of the channels in the lower row.

3,616,767
APPARATUS FOR THE DESTRUCTION OF REFUSE
Kenneth J. Southwick, Quincy, Mass., assignor to Pyro-Magnetics Corporation, Needham, Mass.
Continuation-in-part of application Ser. No. 786,685, Dec. 24, 1968, now Patent No. 3,527,178. This application June 9, 1970, Ser. No. 44,788
Int. Cl. F23g *5/10*
U.S. Cl. 110—8 E **14 Claims**

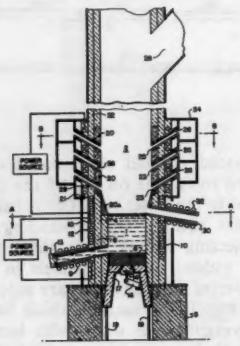
In a novel apparatus useful for the incineration of refuse material employing electrical heating means, the improvement which comprises level sensing means coupled with means for exhausting a portion of the incinerator to limit the level of residue contained within

the incinerator. Essentially, a plurality of spouts are employed along the vertical axis of the incinerator which



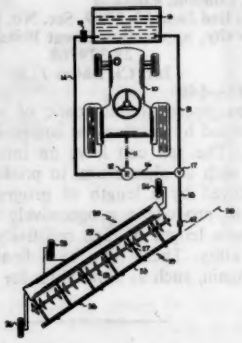
spouts are opened or closed depending upon the level of residue desired as indicated by the sensing means.

3,616,768
APPARATUS FOR THE DESTRUCTION OF REFUSE
Kenneth J. Southwick, Quincy, Mass., assignor to Pyro-Magnetics Corporation, Needham, Mass.
Continuation-in-part of application Ser. No. 786,685, Dec. 24, 1968. This application June 16, 1970, Ser. No. 46,694
Int. Cl. F23g *5/10*
U.S. Cl. 110—8 E **5 Claims**



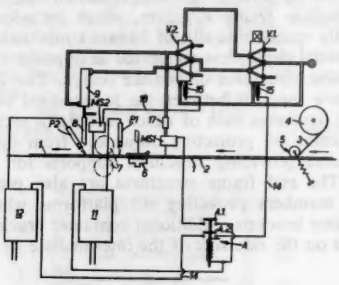
In a novel apparatus useful for the incineration of refuse material comprising adjacent first and second zones in which the first zone is a heat generating zone in which electrical heating means are employed to heat a mass of material disposed therein thereby providing a high temperature environment for a second zone communicating therewith and in which the second zone is the incineration zone and comprises means to introduce refuse material thereto and means to introduce fluids thereto which promote and/or support the incineration of the refuse material, the improvement which comprises auxiliary heating means for providing additional heat within the second zone for limiting the amount of oxygen reaching the first zone, for preheating the oxygen and for preventing slag build-up on the walls of the second zone.

3,616,769
WILD OAT SPRAYER ATTACHMENT
William E. Normand, 3003 Assiniboine Ave., Regina, Saskatchewan, Canada
Filed Nov. 26, 1969, Ser. No. 880,145
Claims priority, application Canada, Jan. 20, 1969, 40,540
Int. Cl. A01g *23/02*
U.S. Cl. 111—6 **1 Claim**



A spray boom is mounted upon a tilling implement so that it can direct the spray directly upon the soil being turned by the disks or tillage members. An arcuately curved shield directs the spray downwardly into the turned soil before it turns completely over so that the spray becomes trapped by the soil, and also prevents the soil from coming into contact with the spray prematurely.

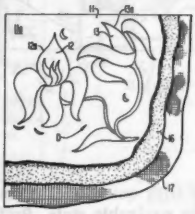
3,616,770
MANUFACTURE OF ELASTICATED GARMENTS
Stanley Charles Blyther, Bassett, and Colin Philip Jones, London, England, assignor to LR Industries Limited, London, England
Filed Jan. 13, 1970, Ser. No. 2,498
Claims priority, application Great Britain, Jan. 15, 1969, 2,360/69
Int. Cl. D05b *23/00*
U.S. Cl. 112—121.26 **5 Claims**



A continuous elastic band is drawn by feed rollers in stretched condition across a work surface and is sewn to garments on the work surface. A pilot photo-cell detects the trailing edge of a garment just before it enters the feed rollers and produces a signal which sets a second photo-electric device. A pneumatically operated cutting device positioned immediately after the feed rollers cuts the elastic band between garments when the second

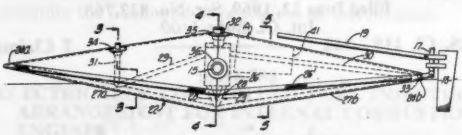
photo-electric device which is adjacent the cutter blade detects a gap between garments. The cutting device will not operate unless the second photo-electric device has been set by a signal from the pilot photo-cell.

3,616,771
EDGE GUIDANCE MECHANISM FOR FLEXIBLE SHEET MATERIAL
Richard W. Gray, Marblehead, Paul E. Morgan, Melrose, and Paul G. Rumball, Beverly, Mass., assignors to USM Corporation, Boston, Mass.
Filed Mar. 13, 1970, Ser. No. 19,257
Int. Cl. D05b *35/10*
U.S. Cl. 112—153 2 Claims



A sewing machine bed, for instance, is provided, ahead of its stitch forming mechanism, with an edge gage and means acting normal to the direction of feed of a feed dog and presser foot for urging the margin of a workpiece yieldingly against the edge gage, whereby the workpiece receives a seam parallel to its marginal edge even if the latter is curvilinear.

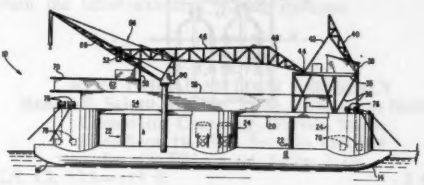
3,616,772
FLOAT AND METHOD OF MAKING SAME
John R. Popkin, 849 S. Normandie Ave., Apt. 104, Los Angeles, Calif. 90005
Filed Sept. 12, 1969, Ser. No. 857,405
Int. Cl. B63b *7/08*
U.S. Cl. 114—.5 F 1 Claim



An improved float structure which finds particular use as a support for water-borne vehicles, such as boats, aircraft, and the like, in which a rigid generally planar elongated skeletal frame structure is encased within a flexible envelope casing which can be sealed with flexible pliable buoyant means therein, or can be provided with one or more removable air filled bladders, the frame structure being characterized by an elongated member extending longitudinally along the bottom of the casing in a manner such that a load force receiving surface is provided with respect to the casing bottom.

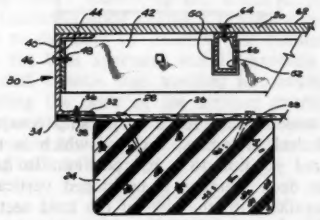
3,616,773
TWIN HULL, VARIABLE DRAFT DRILLING VESSEL
Samuel Harry Lloyd III, Mill Valley, Calif., assignor to Santa Fe International Corporation, Orange, Calif.
Continuation-in-part of application Ser. No. 666,395, Sept. 8, 1967. This application Sept. 4, 1968, Ser. No. 766,662
Int. Cl. B63b *35/00*
U.S. Cl. 114—.5 84 Claims

The vessel comprises a pair of laterally spaced elongated hulls having a plurality of upstanding columns spaced therealong supporting a working platform in spaced relation above the hulls a distance slightly greater than the maximum anticipated wave height. The hulls buoyantly support the vessel in a low draft floating condition with the hulls having freeboard. The hulls have ballast compartments to submerge the hulls and portions of the stabilizing columns to a distance of approximately half the



effective height of the stabilizing columns which is slightly greater than maximum anticipated wave height, to maintain the vessel in a high draft floating condition with the platform elevated above the waterline. The columns stabilize the vessel in the high draft condition about roll and pitch axes. The working platform mounts either a drilling rig or a heavy duty crane or like operational equipment along the centerline of the vessel.

3,616,774
FLOATING DOCK STRUCTURE
Kenneth L. Thompson, Huntington Beach, Calif., assignor to Ye Dock Masters, Inc.
Filed Aug. 15, 1969, Ser. No. 850,608
Int. Cl. B63b *35/00*
U.S. Cl. 114—.5 13 Claims

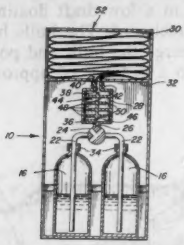


A floating dock structure wherein flotation members support longitudinal frame members which, in turn, support decking for the dock. A plurality of flooring members can be secured to the flotation members and the frame members can be metal channels secured to the floor members. Tying members are secured transverse of the structure, between the channels and support longitudinal underpinning members, extending the length of the structure, to which the decking is secured.

3,616,775
EMERGENCY BUOYANCY GENERATING APPARATUS
Delane A. Holter, Manhattan Beach, Calif., assignor to The Upjohn Company, Kalamazoo, Mich.
Filed July 14, 1969, Ser. No. 841,494
Int. Cl. B63c *7/12*
U.S. Cl. 114—54 6 Claims

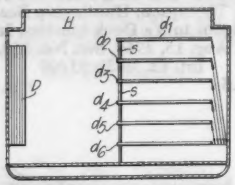
A negatively buoyant body (e.g. damaged marine vessel, aircraft downed at sea, practice torpedo, practice

guided missile etc.) is rendered water-buoyant on command by generating polymer foam reaction mix in a



flexible bag, which is stored prior to use in a collapsed folded condition, and which expands after filling with polymer foam mix to provide the desired buoyancy.

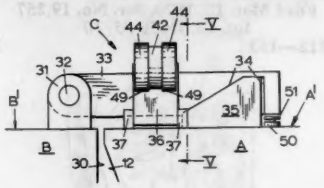
3,616,776
STORABLE 'TWEEN DECKS
Per Arvid Anker-Nilsen, Dr. Lorentzens vei 9, Tonsberg, Norway
Filed Oct. 7, 1969, Ser. No. 864,394
Claims priority, application Norway, Oct. 10, 1968, 4,035/68
Int. Cl. B63b *25/18*
U.S. Cl. 114—76 **8 Claims**



Storable 'tween decks for a cargo ship comprising a plurality of deck members, each of which is movable from a stored position to a use position. In its stored position, the deck member is positioned vertically and generally parallel with the side of the hold section and with the other deck members located in that stored position. In its use position, the deck member extends generally horizontally in the hold section. The edge of each deck member lowermost when the deck member is in a stored position is guided generally vertically at the side of the hold section during movement of the deck member between its stored and use positions. Spacing means are provided at the edge of each deck member which is uppermost in stored position and also at its lowermost edge to space the decks when in use position.

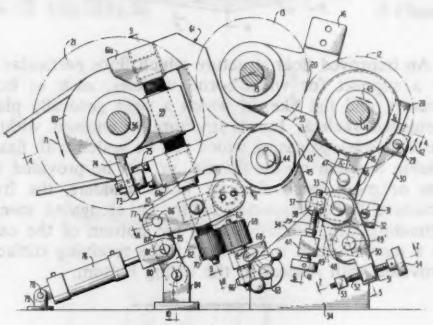
3,616,777
PUSH-TOW CARGO-CARRYING ASSEMBLAGES
Geoffrey Stockdale, 57 Greenleas Road, Wallasey, Cheshire, England
Filed Aug. 29, 1969, Ser. No. 854.097
Claims priority, application Great Britain, Sept. 6, 1968, 42,395/68
Int. Cl. B63b *21/00*
U.S. Cl. 114—235 R **1 Claim**

This invention provides a tug-boat characterised in that its bow or stem is constituted by at least one fairing piece which is displaceable to an out-of-the-way position thereby to leave exposed a bulkhead for being connected push-tow fashion with a barge so as to provide an assembly which can be navigated as a unitary vessel in weather conditions which normally would prevent conventional push-tow arrangements from being employed. Preferably two buoyant fairing pieces are provided pivotally connected one at each side of the vessel and arranged to abut when closed on the longitudinal centre line of the vessel so as to constitute a conventional bow shape. The invention also provides for a push-tow tug-boat and barge



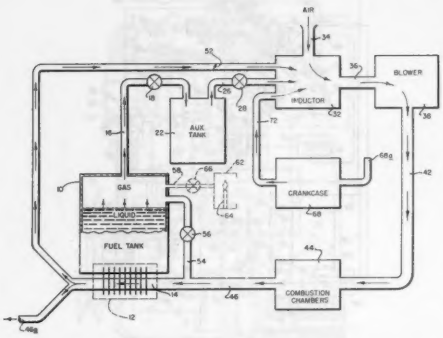
assembly provided with quick release coupling means for connecting same in navigable state. Preferably said coupling means comprise a pair of apertured lugs rigidly mounted at the stern of the barge, a metal strap pivoted between said lugs, a pair of knee brackets mounted at deck level on said tug-boat adjacent to its exposed bulkhead, said metal strap being adapted for operative engagement with said knee brackets, means for locking said metal strap in engagement with said knee brackets, and fluid operable piston and cylinder devices for forcibly releasing said coupling means.

3,616,778
OVERVARNISH ASSEMBLY FOR CONTINUOUS CAN PRINTING MACHINES
Enn Sirvet, Ridgefield, Edward J. Whelan, Hasbrouck Heights, and John P. Skrypek, Clifton, N.J., assignors to Sun Chemical Corporation, New York, N.Y.
Filed June 12, 1969, Ser. No. 832,765
Int. Cl. B05c *1/00*
U.S. Cl. 118—262 **7 Claims**



A pair of metering rollers are adjustably mounted relative to each other, and as a unit relative to a coating roller for controlling the amount of varnish transferred to the coating roller; the coating roller being adjustable relative to a printed container, being conveyed from a printing station, whereby the thickness of the varnish coating applied to the exterior surface of the container may be controlled.

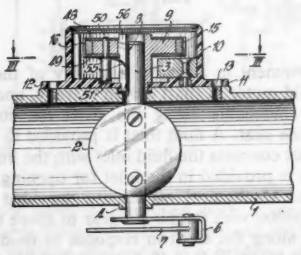
3,616,779
GAS FUELED INTERNAL COMBUSTION ENGINE
Marc S. Newkirk, Lynnfield, Mass., assignor to American Environmental Research Corporation, Malden, Mass.
Filed June 22, 1970, Ser. No. 47,990
Int. Cl. F02m *21/00*; F02f *9/00*
U.S. Cl. 123—27 GE 2 Claims



An internal comustion engine is powered by a gaseous fuel such as hydrogen. The gas is stored in liquid form in an insulated tank. A heat exchanger associated with the tank converts the liquid to a gas at a controlled rate dependent upon the demands of the engine. The gas is then fed to the engine inductor. In the inductor, the gaseous fuel is mixed with air and then pumped under relatively high pressure into the engine combustion chambers to achieve a high compression ratio.

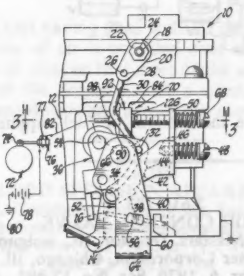
High energy steam exhausting from the combustion chambers is circulated through the heat exchanger where it gives up some of its heat and thence back to the engine combustion chambers where it functions as a cooling and working medium. Any flammable gas which finds it way into the crankcase is scavenged therefrom in order to minimize the likelihood of explosions at that location.

3,616,780
ELECTRICALLY CONTROLLED FUEL INJECTION ARRANGEMENT FOR INTERNAL COMBUSTION ENGINES
Hans Joachim Helle, Tubingen-Lustnau, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany
Filed Sept. 26, 1969, Ser. No. 861,280
Claims priority, application Germany, Sept. 28, 1968, P 17 76 155.6
Int. Cl. F02m *51/00*
U.S. Cl. 123—32 EA 10 Claims



A fuel injection arrangement in which a monostable multivibrator applies control pulses to electromagnetically actuated fuel injection valves of the engine. A switching circuit is linked to the throttle of the engine for the purpose of applying auxiliary injection between each two successively occurring pulses from the multivibrator which is actuated synchronously with the rotational speed of the engine. The switching circuit includes a cam member which is coupled to the throttle through an overrunning slip clutch. The cam member is rotated with the throttle only during the opening motion thereof, whereas the clutch disengages the cam member from the throttle when the latter executes closing motions.

3,616,781
ELECTRICAL SWITCH ASSEMBLY
Robert F. Sciotti, Warren, Mich., assignor to Holley Carburetor Company, Warren, Mich.
Filed Sept. 16, 1969, Ser. No. 858,360
Int. Cl. F02p *5/04*; F02m *1/08*
U.S. Cl. 123—119 F 1 Claim

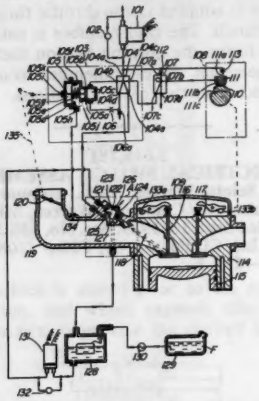


A carburetor body has a projecting boss formed thereon with an aperture formed therethrough including a slot extending axially thereof the full length of the aperture; and an insulating body having a tubular extension is assembled to the boss by inserting the tubular extension through the boss aperture; and a generally cylindrical contact and throttle stop member is assembled thereto by inserting the body of the contact member through the tubular extension until cooperating detent-like locking means are engaging causing the contact member, and insulating body to be locked to the boss.

3,616,782
FUEL SUPPLY DEVICE FOR INTERNAL COMBUSTION ENGINES
Kazuma Matsui, Toyohashi-shi, and Takashi Yamada, Anjo-shi, Japan, assignors to Nippondenso Kabushiki Kaisha, Kariya-shi, Aichi-ken, Japan
Filed Dec. 23, 1969, Ser. No. 887,609
Claims priority, application Japan, Dec. 27, 1968, 43/862
Int. Cl. F02m *37/14*; F15c *1/00*
U.S. Cl. 123—119 R 14 Claims

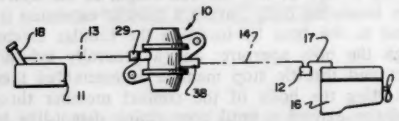
A fuel supply device for internal combustion engines, wherein fuel such as gasoline or other fluid fuel is controllably injected into suction air to be supplied to the engine as a fuel-air mixture, characterized in that the fuel is continuously ejected from a fuel ejecting nozzle under a constant pressure throughout the period of engine operation and whether a fuel jet ejected from said nozzle is supplied into the suction air or received by a fuel receiver to be returned to a fuel reservoir is determined by an air jet which controllably traverses the fuel jet. The performance of said air jet is controlled by supplying compressed air to an air ejecting nozzle in a form of air pulses which are modified from a constant fluid supply by a fluidic control circuit or fluid multivibrator oscillated by

a fluidic or air trigger pulse generator driven in synchronism with the engine. Frequency and duration of the



air pulses determine the amount of fuel supplied to the engine.

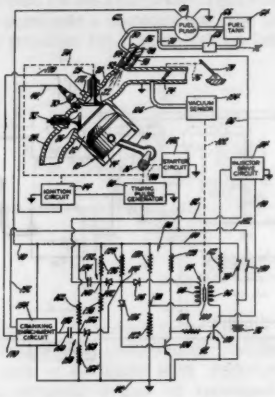
3,616,783
VAPOR CONTROL VALVE
George D. La Masters, Decatur, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.
Filed Mar. 6, 1970, Ser. No. 17,092
Int. Cl. F02m *59/00*
U.S. Cl. 123—136 **2 Claims**



A multifunction valve for controlling vapor from a fuel tank, opens at a first pressure permitting vapor flow toward vapor collecting apparatus and remains open until the pressure has dropped to a second lower pressure; in addition a check valve is provided to compensate for negative pressure or lowering of fuel level, and a safety relief valve is provided to protect the tank and system from excessive pressure.

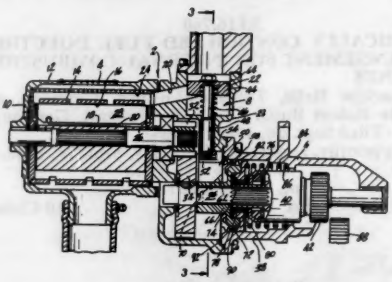
3,616,784
FUEL SUPPLY SYSTEM FOR AN INTERNAL COMBUSTION ENGINE PROVIDING TIME AND VOLTAGE COMPENSATED CRANKING ENRICHMENT
Paul N. Barr, Kokomo, Ind., assignor to General Motors Corporation, Detroit, Mich.
Filed July 17, 1970, Ser. No. 55,630
Int. Cl. F02n *11/08*
U.S. Cl. 123—179 G **4 Claims**

In an electronic fuel injection system, fuel is applied to an internal combustion engine for the duration of individual control pulses developed in synchronization with the rotation of the engine. The engine starting sequence is divided into alternate cranking periods and resting periods. During each cranking period, additional control pulses are supplied at a frequency which is inversely related to the temperature of the engine and which is also inversely related to the supply voltage of a power source. Further, the additional control pulses are supplied only during an enrichment interval. The minimum possible duration of the enrichment interval is determined as a



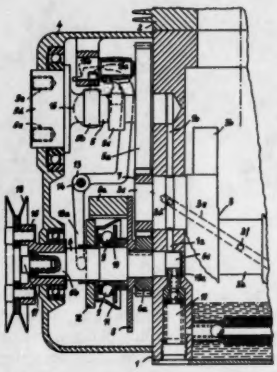
direct function of the duration of the instant cranking period. The maximum possible duration of the enrichment interval is determined as a direct function of the duration of the previous resting period and as an inverse function of the duration of the previous cranking period.

3,616,785
FLUID ACTUATED STARTER ASSEMBLY
Lester E. Smith and Donald E. Bender, Williamson, Ill., assignors to Olin Corporation
Filed June 11, 1970, Ser. No. 45,445
Int. Cl. F02n *7/08, 13/00*
U.S. Cl. 123—179 F **8 Claims**



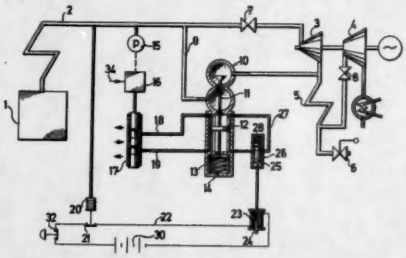
An improvement in a starter assembly of the type including a fluid motor, a shaft driven thereby, and a pinion gear axially moveable along the shaft for engagement with an engine gear. A fluid inlet is provided in the housing and a port connects the fluid inlet with the fluid motor, and a piston is provided in the inlet for opening and closing the port. Mechanical means are provided interconnecting the piston with the pinion gear to move the pinion gear axially along the shaft in response to fluid pressure. The piston is so positioned that it is moveable to a position wherein the port is slightly exposed when the pinion gear is about to engage the engine gear to permit a portion of the pressurized fluid to enter the fluid motor and cause rotation of the shaft.

3,616,786
INTERNAL COMBUSTION ENGINE
Ernst Hatz, Ruhstorf, Germany, assignor to Motorenfabrik Hatz KG., Ruhstorf, Germany
Filed May 19, 1970, Ser. No. 38,655
Claims priority, application Germany, June 10, 1969, P 19 29 386.8
Int. Cl. F02b 75/06, 77/14
U.S. Cl. 123—192 B 9 Claims



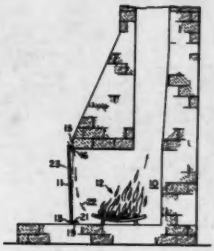
An internal combustion engine, particularly a single cylinder diesel engine, has a crank shaft which drives, on the control side of the engine, two axially-parallel shafts, one of which is a valve control shaft and the other an imbalance shaft. The crank shaft terminates immediately adjacent the main bearing in a short spindle or the like for a pinion which drives both the other shafts. These shafts are arranged on opposite sides of the crank shaft axis and are provided at their ends which project out of the housing with means for driving accessory apparatus or equipment. The imbalance weight on the imbalance shaft is so arranged that the movable elements of a centrifugal regulator occupy the free space within the path of movement of the weight. One end of the imbalance shaft is arranged to drive a lubricating-oil piston pump.

3,616,787
OVERFLOW VALVE FOR A STEAM PLANT
Ernst Vogeli, Wiesendangen, Zurich, Switzerland, assignor to Sulzer Brothers, Ltd., Winterthur, Switzerland
Filed Jan. 2, 1970, Ser. No. 310
Int. Cl. F22d 7/12
U.S. Cl. 122—406 R 10 Claims



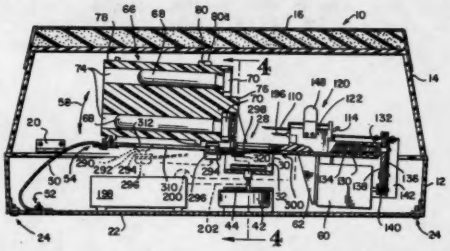
The overflow valve is combined with a servo-piston which opens and closes the valve. The servo-piston is actuated by the opening of a valve in a bridging circuit of the servo-piston which thus allows a flow of oil from one side of the servo-piston to the other via a pair of oil conduits.

3,616,788
HEATING UNIT HAVING TRANSPARENT WINDOW
Harold W. Hannebaum, Gooding, Idaho (P.O. Box 264, Bellevue, Idaho 83313)
Filed Dec. 22, 1969, Ser. No. 887,103
Int. Cl. F24b 1/18
U.S. Cl. 126—135 10 Claims



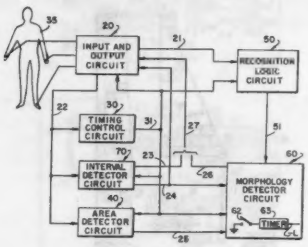
A heating unit having glass walls or doors where a cool vertical curtain of air is provided over the glass by providing a top air vent so that most of the air enters mainly at the top of the fireplace with a substantially vertical velocity vector downward across the glass.

3,616,789
BLOOD SPECIMEN APPARATUS
Robert H. Grabhorn, Indianapolis, Ind., assignor to Systematiks, Inc., Indianapolis, Ind.
Filed Mar. 2, 1970, Ser. No. 15,511
Int. Cl. A61b 5/10
U.S. Cl. 128—2 R 39 Claims



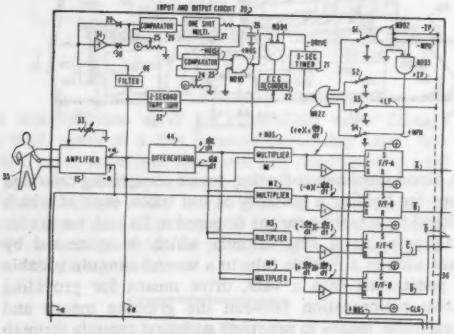
A blood specimen collecting device comprising cartridge means for holding a plurality of test tubes, each of which is closed by a sealing means disposed in its end, means for rigidly gripping a first cannula which is connected by means such as a flexible tube to a second cannula suitable for penetrating into a vein, drive means for providing relative reciprocation between the gripping means and the cartridge means to penetrate such first cannula through such sealing means, and indexing means for moving said cartridge means relative to said gripping means each time there is such relative reciprocation sequentially to place each such sealing means adjacent such first cannula. A third cannula can be provided and connected to the gripping means to be penetrated through such sealing means with the first cannula, this third cannula being connected to a vacuum pump means effective at least partially to evacuate each tube into which the third cannula is penetrated. Means are provided for constricting the flexible tube connecting the first and second cannulae when the first cannula is not penetrated into a test tube, this constricting means being operated by the relative movement of the cartridge means and gripping means.

3,616,790
MULTIFORM VENTRICULAR PREMATURE BEAT DETECTOR
George J. Harris, Framingham, Mass., assignor to American Optical Corporation, Southbridge, Mass.
Filed Jan. 21, 1970, Ser. No. 4,670
Int. Cl. A61b 5/04
U.S. Cl. 128—2.06 A 10 Claims



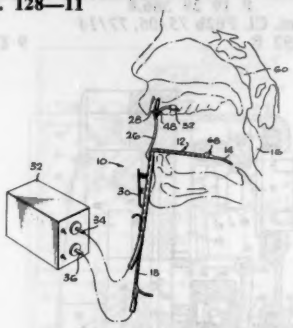
A multiform ventricular premature beat (VPB) detector. Each VPB is classified in one of eight morphological categories. As long as all VPB's are classified in the same category a multiform alarm circuit is not energized. As soon as a VPB of a different morphology is detected, the alarm circuit is triggered to indicate a multiform VPB condition.

3,616,791
ELECTROCARDIOGRAPHIC MORPHOLOGY RECOGNITION SYSTEM
George J. Harris, Framingham, Mass., assignor to American Optical Corporation, Southbridge, Mass.
Filed Apr. 30, 1969, Ser. No. 820,554
Int. Cl. A61b 5/04
U.S. Cl. 128—2.06 A 58 Claims



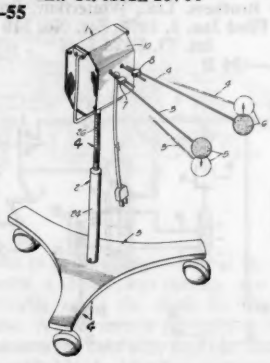
An electrocardiographic monitoring system which recognizes QRS complexes, their rhythm and morphologies. The morphologies of the QRS complexes are memorized during a learning interval at the start of monitoring. Thereafter, different morphologies are identified as abnormal. Each QRS complex is recognized by differentiating it, forming various product signals of itself and its derivative, and registering the sequence in which the various product signals exceed and fall below threshold values. The system also continuously updates a 10-second average of the R-R interval in order to identify premature and late beats, and compensatory pauses.

3,616,792
ILLUMINATING SURGICAL SPECULA
Lawrence Pleet, Los Angeles, Calif.
(18851 Pasadero Drive, Tarzana, Calif. 91356)
Filed Apr. 10, 1969, Ser. No. 815,096
Int. Cl. A61b 1/06, 1/24; G02b 5/16
U.S. Cl. 128—11 3 Claims



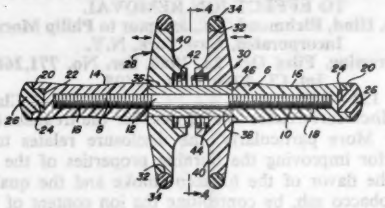
Illuminating surgical specula combining the features of ordinary specula for maintaining access into body cavities and passages with built-in illumination means to provide optimum light upon specific and general regions in which surgical procedures are to be performed. Pharyngeal specula are disclosed in which light is provided by optical fibers which project the proper intensity upon the lymphatic areas of tonsils and adenoids so that surgery is easily accomplished. The fiber optics include a separate light source, connected by means of flexible optical fibers to the speculum, together with the termination of the fiber optics on the speculum to discharge the light at the desired area. A directable nozzle is disclosed for terminating the fiber optics whereby the light can be directed and maintained at the desired region. A pluruality of nozzles are disclosed in combination with a variety of oral dams and tongue depressors for achieving maximized illumination on tonsils and adenoids during surgery thereon.

3,616,793
MASSAGING DEVICE
David A. Draper, 4122 W. 142nd St., Hawthorne, Calif. 90250
Filed Feb. 26, 1969, Ser. No. 802,577
Int. Cl. A61h 23/00
U.S. Cl. 128—55 8 Claims



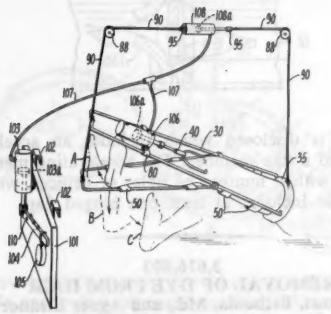
A pendantly mounted massaging device is disclosed having a plurality of independently oscillating balls driven by a motor so that each ball will strike the user independently to perform a massaging action. The balls are mounted on elongated members which are caused to oscillate by contact with a rotating cam surface.

3,616,794
BODY ROLLER
Kenneth L. Gromala, 817 College Ave., Santa Rosa, Calif. 95401
Filed Aug. 19, 1969, Ser. No. 851,176
Int. Cl. A61h *15/00*
U.S. Cl. 128—57 9 Claims



A manually usable portable appliance uniquely adapted for use by a qualified doctor or a knowledgeable and trained assistant and such in construction that it can be expertly and efficaciously used to properly goad, act on and relax super contracted muscles known to be proximal to and functionally involved in the use and control of a patient's spinal column. It is characterized by a shaft having left and right axially twistable handgrips. The median portion is equipped with balanced free turning but spring biased applicator rollers which are paired, spaced, and shiftably adjustable toward and from each other to achieve the results desired.

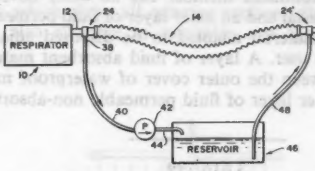
3,616,795
FLUID PRESSURE TRACTION DEVICE
Roy Y. Powlan, 1 Chapel Drive, Lafayette, Calif. 94549
Filed Apr. 21, 1969, Ser. No. 817,915
Int. Cl. A61f *5/04*
U.S. Cl. 128—85 9 Claims



A fluid pressure device for applying traction to orthopedic patients utilizes hydraulic cylinders connected together in a closed fluid system and actuated by applying torque through a calibrated counterweight, resulting in the application of a constant regulated tension on a patient in traction.

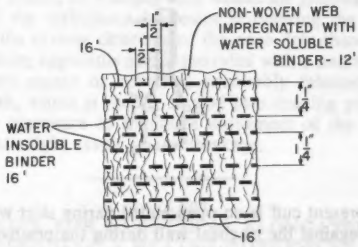
3,616,796
HUMIDIFIED RESPIRATORY TUBE AND METHOD
Richard Robert Jackson, 8 Trinity Road, Marblehead, Mass. 01945
Filed June 30, 1969, Ser. No. 837,397
Int. Cl. A62b *7/02*
U.S. Cl. 128—212 5 Claims

A system for humidifying and delivering gases such as air or oxygen to a patient from a respirator, anesthesia machine or oxygen outlet. The system includes a composite tube formed from an inner water permeable tube through which the gas flows and an outer tube which surrounds the inner tube to define a jacket about the inner tube. Warm water is caused to flow through the jacket and



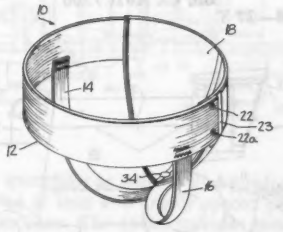
permeates the inner tube so that the water is exposed and absorbed by the air stream. The outlet from the inner tube is directed to the patient who receives the humidified, conditioned gas.

3,616,797
FLUSHABLE WRAPPER FOR ABSORBENT PADS
John F. Champaigne, Jr., Neenah, and Howard A. Whitehead, Appleton, Wis., assignors to Kimberly-Clark Corporation. Neenah, Wis.
Filed Feb. 6, 1970, Ser. No. 9,261
Int. Cl. A61f *13/16, 13/18*
U.S. Cl. 128—290 9 Claims



A flushable wrapper for sanitary napkins, disposable diapers and other absorbent pads. The wrapper comprises a non-woven fiber web bonded by a water-soluble adhesive and overprinted with another binder comprising a spaced pattern of water-insoluble adhesive. The pattern of the latter adhesive is arranged so as to permit the web to be broken up into pieces approximating the size of a postage stamp when the web is soaked in excess water.

3,616,798
DRY INCONTINENT GARMENT
Julius Garfinkel, 8851 18th Ave., Brooklyn, N.Y. 11214
Filed Dec. 18, 1967, Ser. No. 691,606
Int. Cl. A61f *13/16*
U.S. Cl. 128—295 2 Claims



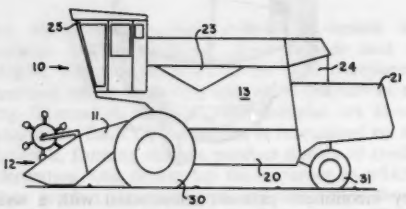
A dry incontinent garment constructed with a waist band adapted to partially surround the body of the user and having support means attached to the waist band on one end. A detachable incontinent member is provided which is adapted to be connected to a waist band and the

support means. Fastening means detachably connect the incontinent member with the waist band and the support means. The fastening means is advantageously adapted to be spaced away from the body of the user. Advantageously, the incontinent member has an outer cover of waterproof material and an inner layer of fluid permeable, non-absorbent material adapted to be disposed adjacent the body of the user. A layer of fluid absorbent material is disposed between the outer cover of waterproof material and the inner layer of fluid permeable non-absorbent material.

3,616,799
TUBES WITH SAIL CUFFS FOR TRACHEAL INTUBATION
Charles H. Sparks, 3725 SE. Martins, Portland, Oreg. 97202
Filed Oct. 8, 1969, Ser. No. 864,773
Int. Cl. A61m *25/00*
U.S. Cl. 128—351 **8 Claims**

The present cuff is an open ended flaring skirt which is pressed against the tracheal wall during the positive pressure phase of mechanical ventilation of the patient's lungs. The sealing pressure is applied by the ventilating gas itself whereby the pressure of the cuff against the tracheal wall can never exceed that of the ventilating gas and whereby the cuff is relaxed in each breathing cycle when the ventilating gas is not above atmospheric pressure. A slidable sleeve sheaths the skirt for intubation and unsheaths the skirt after intubation. The cuff is used on endotracheal, nasotracheal and tracheostomy tubes.

3,616,800
AXIAL FLOW TYPE COMBINE WITH A DISCHARGE CONVEYOR
Edward William Rowland-Hill and James W. McDuffie, New Holland, Pa., assignors to Sperry Rand Corporation, New Holland, Pa.
Filed Nov. 24, 1969, Ser. No. 879,215
Int. Cl. A01f *7/06*
U.S. Cl. 130—27 T **14 Claims**

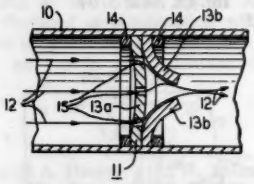


An axial flow type combine has an axial flow threshing and separating means threshing and separating grain from crop material and discharging the crop material onto a conveyor for removal of remaining entrained grain and discharge of the crop material at the rear of the combine.

3,616,801
PROCESS FOR THE TREATMENT OF TOBACCO TO EFFECT ION REMOVAL
John D. Hind, Richmond, Va., assignor to Philip Morris Incorporated, New York, N.Y.
No Drawing. Filed Oct. 28, 1968, Ser. No. 771,268
Int. Cl. A24b *3/14, 15/08*
U.S. Cl. 131—143 **1 Claim**

This disclosure relates to a process for the treatment of tobacco. More particularly, the disclosure relates to a process for improving the burning properties of the tobacco, the flavor of the tobacco smoke and the quality of the tobacco ash, by controlling the ion content of the tobacco. The process involves the steps of (1) contacting tobacco plant parts with water to obtain an aqueous tobacco extract, (2) treating said extract to adjust its content of certain metallic ions, without removing desirable tobacco constituents and (3) recombining the treated aqueous tobacco extract with the extracted tobacco parts. The adjustment of the ion content of the aqueous tobacco extract may be accomplished by contacting the extract with an ion-exchange resin. If desired, other ions may be added to the treated tobacco plant parts to further improve the final tobacco product.

3,616,802
FILTERING DEVICE
Frank A. Marinaccio, Clark Road, Bernardsville, N.J. 07924
Filed Aug. 20, 1969, Ser. No. 851,637
Int. Cl. A24d *1/04*; A24f *7/04, 13/06*
U.S. Cl. 131—261 B **7 Claims**



A filter is disclosed which includes an accelerating member and a flap member. The accelerating member is perforated with a number of holes or orifices, while the flap member includes at least one hinged flap.

3,616,803
REMOVAL OF DYE FROM HAIR
John Menkart, Bethesda, Md., and Agnes Eleanor Davis, Vienna, Va., assignors to The Gillette Company, Boston, Mass.
No Drawing. Filed May 21, 1969, Ser. No. 826,660
Int. Cl. A61k *7/12*
U.S. Cl. 132—7 **3 Claims**

Composition for application to human hair to remove dye therefrom is a two-phase liquid system of water and organic solvent for the dye, the system containing at least 1% by weight of dissolved salt and having a pH of 7.5–11.5.

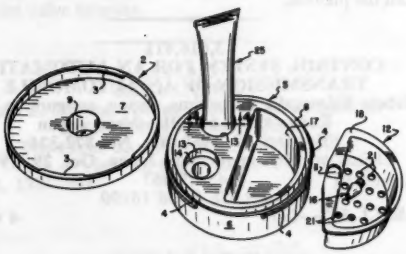
3,616,804
HAIR STYLING DEVICE
Curtis J. Simoneaux, Belle Rose, La. 70341
Filed May 26, 1969, Ser. No. 827,621
Int. Cl. A45d *2/00*
U.S. Cl. 132—40 **4 Claims**

The hair styling device includes a cylindrical roller having an axially extending slot through its wall and opening at one end of the roller. The slot terminates

short of the opposite end of the roller. The edges of the slot diverge at its open end to facilitate reception of hair into the slot. The hair is initially rolled about a first roller and the larger diameter slotted roller is received axially about the first roller with the rolled hair about the first roller extending through the slot of the

second roller. The hair is then rolled about the slotted roller. A third roller having a similar slot formation and a larger diameter than the second roller is receivable axially about the first and second rollers, with the rolled hair about the second roller extending through the slot in the third roller.

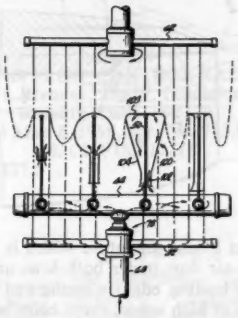
3,616,805
APPLICATOR TIP TREATMENT UNIT
Arnold Rex Marsee, Lima, Ohio, assignor to Artex Hobby Products, Inc., Lima, Ohio
Filed Jan. 3, 1969, Ser. No. 788,900
Int. Cl. B08b *3/04*
U.S. Cl. 134—85 **2 Claims**



A compact treatment unit for cleaning and otherwise treating tip applicators used with marking tubes and other applicator devices for dispensing and applying paints and other liquids. The unit includes a housing body and cover adapted to support and enclose bath means for bathing detached applicator tips and includes a tube stand and soaking pit for treating a tip applicator while attached to its tube. The tip bath means may include means for draining applicator tips as they are removed from the bath.

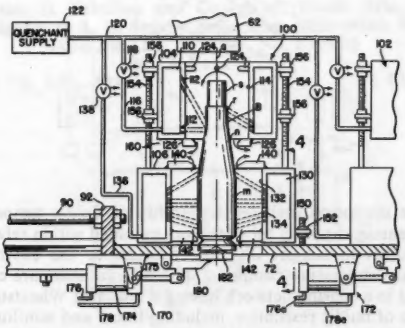
3,616,806
WASHING APPARATUS
Max Randall, 525 Longview Road, South Orange, N.J. 07079
Filed July 30, 1969, Ser. No. 846,195
Int. Cl. B08b *3/02, 9/08, 11/02*
U.S. Cl. 134—168 R **7 Claims**

A washing apparatus, intended primarily for the thorough washing and rinsing of the varied shapes of laboratory glassware, such as flasks, test tubes, bottles and the like. The glassware is mounted in inverted position on hollow, supporting spindles through which washing fluid is introduced against and is effective in cleaning the glassware interior surfaces. The mounted glassware is additionally positioned between opposing upper and lower sprays which clean all exterior surfaces, the lower spray being also effective to minimize any blockage, due to



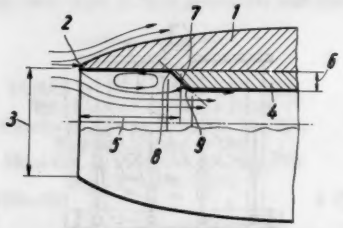
capillary action, of washing fluid within the glassware because of the turbulance it creates in entering the glassware in the reverse direction of drainage flow therefrom. The washing apparatus also is provided with a noteworthy hold-down means or covering, preferably fabricated of wire mesh, which is readily moved into draping position over the glassware to minimize movement of the glassware that might result in its breakage.

3,616,807
DEVICE FOR QUENCHING ELONGATED INDUCTIVELY HEATED WORKPIECES
Richard J. Collins, Cleveland, and John R. Laughlin, Brecksville, Ohio, assignors to Park-Ohio Industries, Inc., Cleveland, Ohio
Filed Aug. 4, 1969, Ser. No. 847,203
Int. Cl. B08b *3/00*
U.S. Cl. 134—199 **7 Claims**



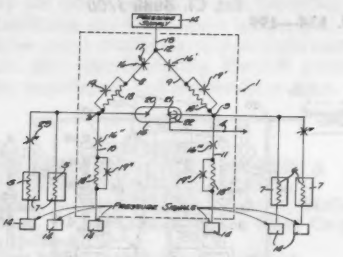
A device for quenching an inductively heated, elongated workpiece having at least two axially spaced portions of different cross-sections. The device includes two separate quench bodies having internal dimensions generally matching the two separate portions of the workpiece and a space between the bodies to allow quenchant to flow through this space for more uniform quenching of the two different dimensioned portions of the workpiece.

3,616,808
JET ENGINE
Jurgen Barche, Bremen, Germany, assignor to Vereinigte Flugtechnische Werke G.m.b.H., Bremen, Germany
Filed Dec. 1, 1969, Ser. No. 881,148
Claims priority, application Germany, Dec. 10, 1968, P 18 13 761.6
Int. Cl. F02b *27/00*
U.S. Cl. 137—15.1 7 Claims



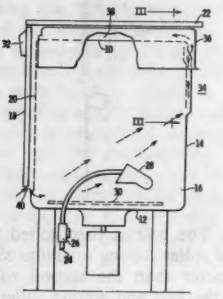
An aircraft jet engine air intake which is configured to provide smooth air flow under both low- and high-speed conditions. The leading edge is configured to allow for smooth air flow at high speed, there being a shoulder arranged interiorly of the air intake, which shoulder has a leading face that is spaced rearwardly, considered in the direction of the air flow, from the leading edge of the air intake so that the shoulder reduces the inside dimension of the air intake, beginning at a point spaced rearwardly from the leading edge, to a dimension smaller than at the leading edge. The leading face of the shoulder has a streamlined profile which allows the smooth flow of air.

3,616,809
FLUIDIC CONDITION SENSING APPARATUS
Richard N. Laakaniemi and Norbert T. Schmitz, Milwaukee, Wis., assignors to Johnson Service Company, Milwaukee, Wis.
Filed Aug. 28, 1969, Ser. No. 853,730
Int. Cl. F15c *1/20, 4/00*
U.S. Cl. 137—81.5 16 Claims



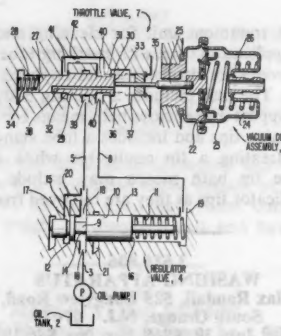
The disclosure includes a plurality of fluidic temperature sensing capillary tube resistors mounted within related enclosures to subject the tube resistors to the environmental temperature condition. The tube resistors are connected in a sensing network having a modified Wheatstone bridge of fluidic resistance, including linear and non-linear capillary tube resistors and non-linear orifice restrictors providing compensation for pressure, temperature and the like. A summing impact modulator is connected across the output terminals of the bridge. The one input side is connected to a fluid source and the adjacent legs include a variable restrictor or pressure regulator for adjusting of a desired set point. The opposite input side has the legs connected to pressure signal and/or reference sources. The temperature sensing capillary tube resistances are connected in parallel with the two branches connected to the latter input side. The output of the summing modulator is a pressure signal directly related to the temperatures of the capillary tube resistors, which is connected in an environmental control loop.

3,616,810
DOMESTIC DISHWASHER DRYING ARRANGEMENT
Charles F. Ter Bush, Elmhurst, Ill., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.
Filed Sept. 24, 1969, Ser. No. 860,570
Int. Cl. A47l *15/48*
U.S. Cl. 134—94 7 Claims



A front loading dishwasher drying arrangement in which air during the drying cycle is admitted into the dishwasher chamber adjacent the lower end of the front wall and exits carrying moisture through an opening in the upper portion of the rear wall, this rear wall opening being in communication with a plenum formed between the top wall of the dishwasher chamber and an overlying cap structure. The relatively cool cap structure serves as a condenser upon which the moisture in the air condenses, and from which it is subsequently evaporated and escapes from the plenum.

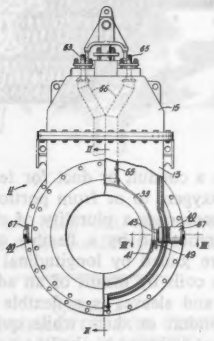
3,616,811
CONTROL SYSTEM FOR AN AUTOMATIC TRANSMISSION OF AN AUTOMOBILE
Tetsuo Shimosaki, Hiroshima, Japan, assignor to Toyo Kogyo Co., Ltd., Hiroshima, Japan
Filed Oct. 29, 1969, Ser. No. 872,324
Claims priority, application Japan, Oct. 29, 1968, 43/79,067
Int. Cl. G05d *16/00*
U.S. Cl. 137—117 4 Claims



A control system for an automatic transmission of an automobile for controlling the line pressure in response to the increase of the torque transmitted from wheels and

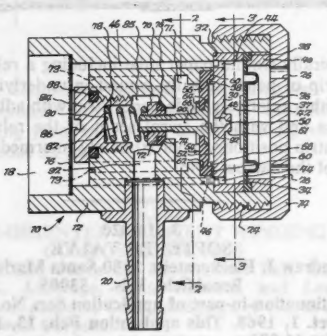
of engine torque having a throttle valve, a regulator valve for regulating the line pressure in response to the transmitting direction of the torque by detecting the intake manifold vacuum and applying the alternate throttle pressure to the regulator valve in accordance with the value of the intake manifold vacuum.

3,616,812
BACK-DRAFT VALVE
Joseph A. Vietorisz, Pittsburgh, Pa., assignor to Koppers Company, Inc.
Filed July 23, 1969, Ser. No. 844,136
Int. Cl. F16k *49/00*
U.S. Cl. 137—340 **2 Claims**



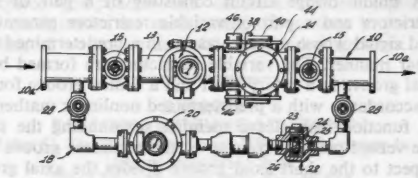
A back-draft valve for use with a blast furnace includes a water-cooled valve seat panel that is removable and replaceable and that has a locking mechanism to secure the valve seat in position. Also included is a frustoconical refractory lining on the fluid entrance passageway and a cylindrical refractory lining on the fluid exit passageway of the valve housing.

3,616,813
REGULATOR
James E. Nelson, Williamsville, N.Y., assignor to A-T-O Inc., Cleveland, Ohio
Filed June 23, 1969, Ser. No. 835,659
Int. Cl. G05d *16/06*
U.S. Cl. 137—491 **10 Claims**



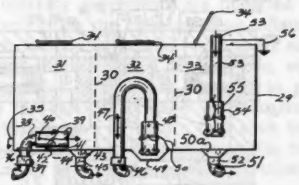
A regulator comprising a body having a breathing fluid inlet passage and an outlet passage connected to the mask of a user with a control valve interposed between the inlet and outlet passage. A plate is mounted in the body and is provided with an orifice. A first diaphragm is mounted in the body on one side of the plate and a second diaphragm, operatively connected to a control valve, is mounted in the body on the other side of the plate. Upon inhalation, the first diaphragm is flexed to close the orifice, causing a build-up of pressure which acts on the second diaphragm to flex the same and open the control valve thereby establishing communication between the inlet and outlet passage. Upon exhalation, the orifice is opened to return the second diaphragm to its normal position, the control valve being carried by the second diaphragm into closing position.

3,616,814
FLUID FLOW CONTROL VALVE
Edward L. Hendey, 558 W. Pendleton Road, Banning, Calif. 92220
Filed May 2, 1968, Ser. No. 725,990
Int. Cl. F16k *15/18*
U.S. Cl. 137—527.8 **2 Claims**



A fluid flow control valve that automatically responds to the flow rate by opening if the flow is beyond a given level and remains closed if below a predetermined value. The valve member is connected to a lever arm that is biased by an adjustable biasing arm. The biasing arm receives the lever arm in a detent notch when the valve member is in a closed position. The effect of the notch, lever and biasing arm arrangement is to cause the valve member to move quickly toward a fully open position, after fluid flow reaches and exceeds a predetermined value. The valve can be adjusted to respond to different flow rates.

3,616,815
FLOW SYSTEM HAVING ELECTROSTATIC CHARGE REDUCER
Charles D. Erickson and George A. Ciotti, Erie, Pa., assignors to A. O. Smith Corporation, Milwaukee, Wis.
Filed June 17, 1969, Ser. No. 834,023
Int. Cl. B65d *87/48*
U.S. Cl. 137—591 **6 Claims**

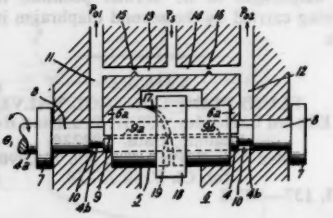


A flow system for petroleum products and the like. An unshrouded static charge reducer tube is connected in the storage means of the flow system for eliminating electrostatic charge resulting from liquid flow. The reducer is formed of a suitable plastic and a plurality of pins project inwardly into the internal flow passageway. A conductive member connects the pins to the storage means or some other element which defines a ground connection.

3,616,816
FLUIDIC FUNCTION GENERATOR

Thomas S. Honda, Scotia, N.Y., assignor to General Electric Company

Filed June 1, 1970, Ser. No. 42,224
Int. Cl. F15c *3/02*; F16k *11/14*
U.S. Cl. 137—609 10 Claims



A fluidic bridge circuit consisting of a pair of fixed restrictors and a pair of variable restrictors generates a fluid signal whose pressure varies in a predetermined nonlinear manner. The variable restrictors are formed by an axial groove in a rotary shaft and a vented groove formed in accordance with a predetermined nonlinear mathematical function in a sleeve member surrounding the shaft. The vented point of overlap of the nonlinear groove with respect to the shaft axial groove divides the axial groove into the two variable restrictors. Pressurized fluid is supplied to the juncture of the fixed restrictors, and the fluid pressure at the juncture of each fixed and variable restrictor varies nonlinearly with change in shaft angular position in accordance with the predetermined nonlinear function.

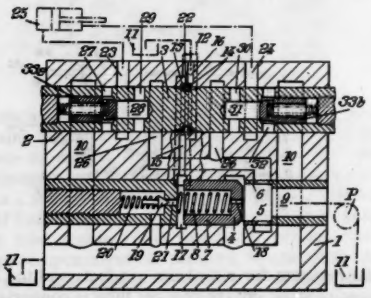
ERRATUM

For Class 137—624 see:
Patent No. 3,616,820

3,616,817
HYDRAULIC DISTRIBUTORS

Louis Pignolet, Lyon, France, assignor to Societe Industrielle Generale de Mecanique Appliquee S.I.G.M.A.

Filed Aug. 4, 1969, Ser. No. 847,319
Int. Cl. F16k *11/07*
U.S. Cl. 137—625.68 10 Claims

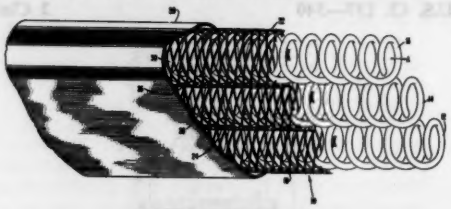


An improved hydraulic distributor having a body and a plunger positioned within a bore in said body to form a slide valve. The slide valve communicates with a pilot valve and a control circuit. The bore and/or the plunger have narrow longitudinal slots in their sliding surfaces to effect gradual opening and closing of the control circuit during said relative displacements. The distributor is especially useful in heavy earth-moving machines.

3,616,818
CRUSH RESISTANT CONDUIT

Melvin C. Case and George P. Durney, Dover, Del., assignors to ILC Industries, Inc., Dover, Del.

Filed Dec. 9, 1968, Ser. No. 782,283
Int. Cl. F16l *11/10*
U.S. Cl. 138—129 13 Claims

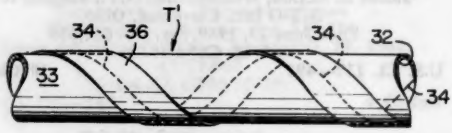


Disclosed is a conduit or duct for feeding life support gas, such as oxygen, to or from portions of a spacesuit. The conduit comprises a plurality of side-by-side helical coils, each surrounded by a flexible open mesh sleeve. The sleeves are joined by longitudinal stitching and are secured to the coils by means of an adhesive. Surrounding the coils and sleeves is a flexible gas impermeable cover. The conduit or duct, while quite flexible, is extremely resistant to being crushed.

3,616,819
SPIRALLY WOUND PAPER TUBE

Charles K. Dunlap, Jr., and James A. Fink, Hartsville, S.C., assignors to Sonoco Products Company, Hartsville, S.C.

Original application Jan. 5, 1966, Ser. No. 519,819, now Patent No. 3,468,733. Divided and this application Mar. 25, 1969, Ser. No. 840,563
Int. Cl. F16l *9/16*; B31c *3/04, 9/00*
U.S. Cl. 138—144 2 Claims



A spirally wound paper tube including a relatively narrow strip of paper spirally wound in underlying relationship with a relatively wide paper strip with adhesive therebetween and with the spiral seam of the relatively wide paper strip positioned approximately intermediate the side edges of the narrow strip.

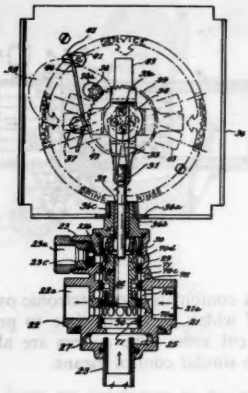
3,616,820
SOFTENER VALVE

Andrew J. Fleckenstein, 2880 Santa Marin Drive, Brookfield, Wis. 53005

Continuation-in-part of application Ser. No. 764,178, Oct. 1, 1968. This application Feb. 13, 1970, Ser. No. 11,071
Claims priority, application Switzerland, Sept. 30, 1969, 14,721/69
Int. Cl. G05b *19/06*
U.S. Cl. 137—624.13 27 Claims

A water softening valve and timing mechanism which is formed to provide a short stroke of an operating piston

in the valve and formed so that once actuation of the valve is started, the piston moves continuously through



several positions for backwash, regeneration, etc., continuously until the entire conditioning cycle is completed.

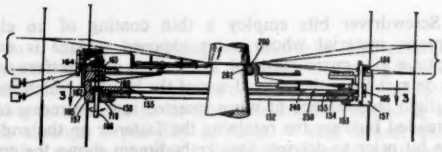
3,616,821
WEFT COMPACTOR FOR CIRCULAR WEAVING MACHINE

Paul D. Emerson, 4512 Pamlico, Raleigh, N.C. 27609; S. Jack Davis, 402 Clayton Road, Chapel Hill, N.C. 27514; John C. Oatfield, 213 E. Dowell Drive; and Fred H. Engelman, Pamlico Drive, both of Cary, N.C. 27511; and Charles E. Bartee, Alston Avenue Road, Durham, N.C. 27703

Original application Dec. 31, 1968, Ser. No. 793,921. Divided and this application Dec. 8, 1969, Ser. No. 882,386

Int. Cl. D03d *37/00*

U.S. Cl. 139—13 **3 Claims**



A fabric compactor for use in combination with a three-dimensional weaving machine is adaptable for packing filling yarns in a shed, the shed being annularly arranged about an axis.

3,616,822
STRESS-ORIENTED FILAMENT WINDING IN COMPOSITE PANELS

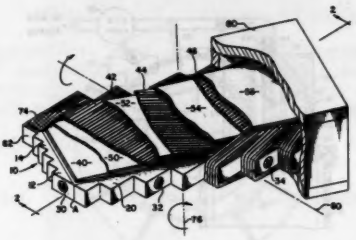
David I. Sinizer, Playa del Rey, Albert Toy, Gardena, David G. Atteridge, Santa Monica, and Louis H. Fanelli, Los Angeles, Calif., assignors to North American Rockwell Corporation

Original application June 16, 1967, Ser. No. 646,582, now Patent No. 3,537,170, dated Nov. 3, 1970. Divided and this application Feb. 9, 1970, Ser. No. 14,703

Int. Cl. B21f *3/04*

U.S. Cl. 140—92.2 **1 Claim**

Removable terraced peripheral edges on a rotating mandrel are adapted to receive successive windings of thin filament in a plurality of separate layers to form reinforced composite panels. The mandrel edges are reversed in position between each winding step to permit winding of filaments at stress-oriented cross-ply angles



with a minimum of filament wastage, after which the workpiece components are diffusion bonded together. Rare earth oxides are used in stop-off coatings to prevent bonding of workpiece materials to mandrel surfaces.

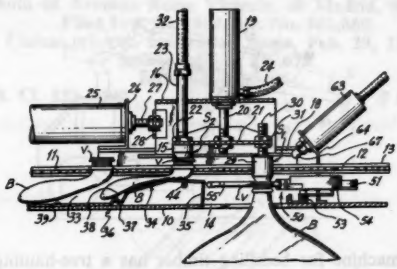
3,616,823
BALLOON VENDING MACHINE

John G. Dello Iacono, Camp Hill, Pa., assignor to Miner Industries, Inc.

Filed May 27, 1970, Ser. No. 40,865

Int. Cl. B65b *43/12*

U.S. Cl. 141—137 **10 Claims**



In a machine for vending inflated balloons from a flexible conveying belt having openings uniformly spaced apart along the belt to retain the necks of uninflated balloons each having a check valve in the respective neck, and in which indexing movements are imparted to the belt to successively bring the balloons to an inflating station where each balloon is inflated with gases supplied thereto through a nozzle engaged, from above, with the respective check valve, devices are provided to prevent tampering with the balloons or their removal from the belt prior to inflation and to ensure that each balloon, when being inflated, properly depends from the belt for avoiding bursting of the balloons during inflation.

3,616,824
LEVEL DETECTOR DEVICE FOR ADDING CONDUCTIVE LIQUID TO A CONTAINER

Daniel Orlando, Brookfield, Wis., assignor to Globe-Union, Inc., Milwaukee, Wis.

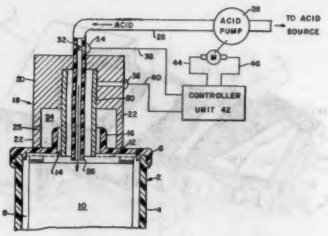
Filed Jan. 20, 1970, Ser. No. 4,283

Int. Cl. H01m *7/00*

U.S. Cl. 141—198 **6 Claims**

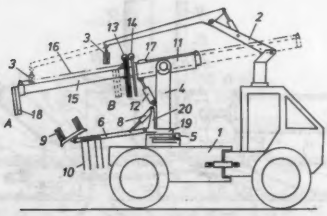
A liquid level detector for adding electrically conductive liquid to a container which comprises an electrically

non-conductive feed conduit for directing a stream of conductive liquid to the container, a first electrically conductive probe extending into the container to the desired level of conductive liquid therein, a second electrically conductive probe immersed in the stream of conductive liquid



within the feed conduit and control means electrically connected to the first and second probes and operatively associated with the feed conduit for stopping the addition of conductive liquid to the container when the desired level is reached in the container.

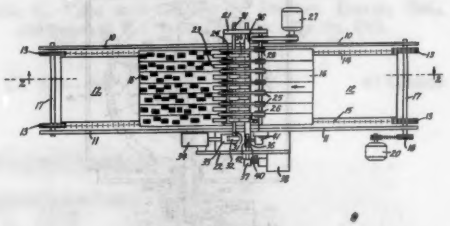
3,616,825
MACHINE FOR HANDLING TIMER
Mikko Kantola, Haukilahti 5, Finland
Filed May 12, 1970, Ser. No. 36,512
Int. Cl. A01g *23/02*
U.S. Cl. 144—3 D **5 Claims**



A machine for handling timber has a tree-hauling jib which is mounted on a tractor or similar vehicle and can be turned in vertical and horizontal planes. The jib has a gripping element for grasping the tree. The machine also includes a trimming device provided with timber-handling equipment which is also mounted on a suitable vehicle and can be turned in vertical and horizontal planes. The characteristic feature of this invention consists in that the machine also includes a feeding jib provided with a claw for gripping trees to be trimmed and adapted to be turned in vertical and horizontal planes. The machine operates in that the hauling jib presents the tree to the feeding jib and the tree can be moved into the gripping elements of the trimming device with the use of the feeding jib.

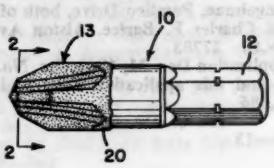
3,616,826
CONTROL MEANS FOR CUTTING FLAT SURFACES
Norman A. Murphey, Anderson, and Ronald W. Southworth, Redding, Calif., assignors to U.S. Plywood-Champion Papers Inc., New York, N.Y.
Filed May 6, 1970, Ser. No. 35,011
Int. Cl. B27c *5/02*
U.S. Cl. 144—136 **10 Claims**

An electronic circuit control means for producing random spaced surface cuts on panels or boards to simulate a hand hewn product. A line of cutter wheels is positioned above the panel or board surface and controlled elements move toward the panel surface to remove a small portion of the surface. The cutter wheel motion is con-



trolled by a combination of electronic oscillators, the frequencies of which vary with time to produce a random pattern of cut areas. The cutters are also moved transversely by a similar control means.

3,616,827
NON-MAGNETIC FASTENER PICK-UP AND DRIVING TOOL
George B. Stillwagon, Jr., Dayton, Ohio, assignor to Gardner-Denver Company, Dayton, Ohio
Filed Aug. 11, 1969, Ser. No. 848,876
Int. Cl. B25b *15/00, 23/08*
U.S. Cl. 145—50 D **6 Claims**

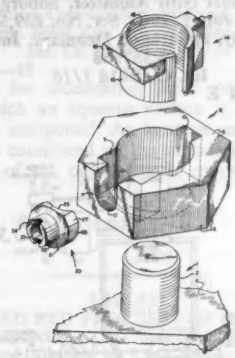


Screwdriver bits employ a thin coating of an elastomeric material whose outer exposed surface is nontacky, e.g., a cured material, which does not interfere with or detract from the normal use of the bits but which form a slight interference fit when inserted into the recess of a threaded fastener for retaining the fastener on the end of the bit prior to driving. One embodiment shows the coating entirely covering the end of the bit and in another embodiment the coating is excluded from the radially outward faces of the driving wings so as not to interfere with the insertion of the bit in a recess.

3,616,828
FASTENER CONSTRUCTION
Floyd E. Jessmore, 1741 Sullivan Drive, Saginaw, Mich. 48603
Filed Sept. 15, 1969, Ser. No. 857,695
Int. Cl. F16b *37/00, 39/02*
U.S. Cl. 151—19 A **12 Claims**

A fastener according to the invention comprises a threaded bolt loosely accommodated in an annular, nut-like retainer and a tubular, interiorly threaded, split sleeve interposed between the bolt and the retainer. The sleeve and the retainer have a key and keyway, respectively, to prevent relative rotation therebetween. The retainer has a recess and the sleeve has a flange which overlies the base of the recess. A clamping cam acts between the base

of the recess and the flange to contract the sleeve radially into snug engagement with the threads of the bolt and to



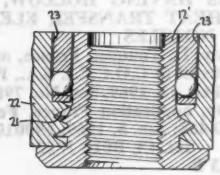
exert an axial force on the sleeve to prevent looseness between the latter and the retainer.

3,616,829

HARD METAL INSERT FOR SOFT METAL BODIES

Leslie A. Runton, Canton, Mass., assignor to Phillips Screw Company, Natick, Mass.

Filed Apr. 23, 1970, Ser. No. 43,297
Int. Cl. F16b *39/06*
U.S. Cl. 151—23 **9 Claims**



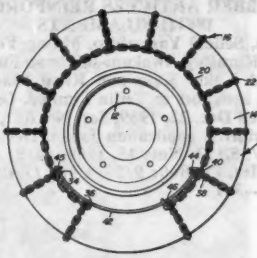
In a device comprising an internally and externally threaded tubular hard metal insert for anchoring threaded elements in soft metal parent bodies, the external thread being interrupted by at least one keyway extending axially through a plurality of turns of said thread, and a locking member having at least one tang dimensioned to fit tightly into said keyway, a corresponding keyway being broached through the thread of a threaded insert-receiving aperture in said parent body as said locking member is driven home, the improvement consisting in providing each tank with a radially extending circular aperture therethrough and securing a hard metal ball in said aperture so as to extend slightly beyond each circumferential surface of the tang whereby when the tang is driven home the said ball is under compression between the outer wall of the insert and the adjacent metal of the parent body, enhancing the locking effect as well as ensuring a tighter fit between the insert and the threaded element to be received therein. In a special embodiment the insert is formed with an outwardly directed annular flange at one end, for seating against the inner surface of a cylinder head, to eliminate leakage around the insert and also to prevent the latter from being dislodged by reason of the internal pressure when the insert is used for anchoring a spark plug in the cylinder head of an internal combustion engine.

3,616,830

TIRE CHAIN FASTENING DEVICE

Roy F. McGill, 538 W. Poplar St., Gastonia, N.C. 28052

Filed Oct. 29, 1969, Ser. No. 872,110
Int. Cl. B60c *27/10*
U.S. Cl. 152—213 A **3 Claims**



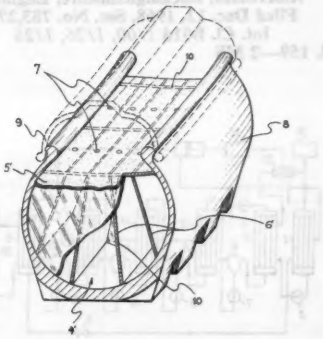
A fastening device for securing tire chains on the drive wheels of an automotive vehicle employing an elongated arcuate connecting member associated with the ends of the circumferential side chain for the circumferential chain at the inner side of the tire and wheel assembly together with an adjustable turnbuckle structure interconnecting the ends of the circumferential chain at the outer surface of the tire and wheel assembly.

3,616,831

PUNCTURE PROOF OR UNDEFLATABLE TIRE

Jose Amestoy Lafuente and Juan Antonio Leon Melero, both of Avenida Reina Victoria, 40 Madrid, Spain

Filed Feb. 25, 1969, Ser. No. 802,069
Claims priority, application Spain, Feb. 29, 1968 (utility model), 136,679
Int. Cl. B60c *5/06*
U.S. Cl. 152—342 **5 Claims**



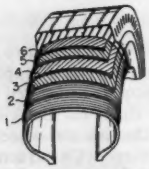
Puncture proof or undeflatable tire which may be of the tubed or tubeless variety but in either event provided with a plurality of substantially air-tight cells adjacent a manifold which is adapted to have a normal inlet from the exterior of the tire through a tire valve which may pass through the wheel rim and wherein the manifold is connected to each of the cells through a valve which permits air to pass through the manifold to a cell when the pressure of a particular cell has critically dropped due to a puncture or a rupture of a wall thereof. The tires in accordance with the instant invention may also include a special valve located between each cell

in the manifold of such a nature as will permit air from the manifold to be passed to a cell which has lost air and will also permit air to be passed from the cell back to the manifold when the manifold pressure has been relieved by opening its inlet valve.

3,616,832
RUBBER ARTICLES REINFORCED WITH FILAMENTS

Takeo Shima, Seiichi Yamashiro, Masao Yoshimura, and Takatoshi Kuratsuji, Iwakuni-shi, Iwao Fujimoto, Wakimachi, and Yukio Kato and Kenji Maeda, Iwakuni-shi, Japan, assignors to Teijin Limited, Osaka, Japan

Filed Dec. 22, 1969, Ser. No. 887,237
Claims priority, application Japan, Dec. 24, 1968, 43/95,173; Nov. 15, 1969, 44/91,686
Int. Cl. B60c *9/20*; C08g *17/06*
U.S. Cl. 152—361 8 Claims

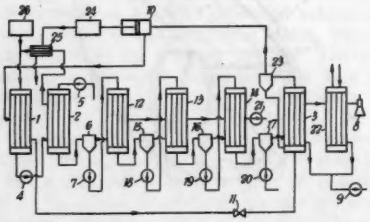


A rubber article, especially a tyre and a belt, reinforced with the filaments of a substantially linear polyester consisting essentially of ethylene naphthalene-2,6-dicarboxylate recurring units and having an intrinsic viscosity of at least 0.5 and a concentration of carboxyl groups of less than 60 equivalents per million grams of the polymer.

3,616,833
EVAPORATION OF LIQUOR

John Moseley Davies, Lavender Cottage, Weedon Lane, Amersham, Buckinghamshire, England

Filed Dec. 12, 1968, Ser. No. 783,275
Int. Cl. B01d *1/00, 1/26, 1/28*
U.S. Cl. 159—2 MS 10 Claims

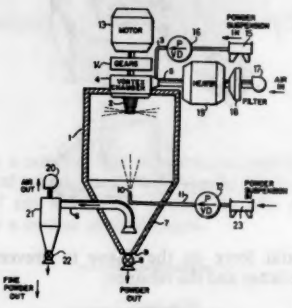


Part of a liquor is evaporated using a first heat-exchanger in which heat is transferred from a refrigerant to an intermediate fluid. A second heat-exchanger is provided to receive the heated intermediate fluid from the first heat-exchanger and a supply of the liquor to be processed. Heat is transferred from the intermediate fluid to the liquor and the liquor is partly vaporized in the second heat-exchanger. The vapor portion of the liquor is then supplied to a third heat-exchanger in which heat is transferred from the vapor to a refrigerant. A compressor is arranged to receive the vaporized refrigerant from the third heat-exchanger whereby it is liquified and returned to the first heat-exchanger.

3,616,834
SPRAY DRYING DEVICE AND METHOD FOR THE OPERATION OF SAME

Jorgen Christian Gorm Hansen, Charlottenlund, and Henning Jorgen Helsing, Rodovre, Denmark, assignors to Aktieselskabet Niro Atomizer, Soborg, Denmark

Filed July 7, 1969, Ser. No. 839,546
Claims priority, application Denmark, July 9, 1968, 3,357/68
Int. Cl. B01d *1/16*
U.S. Cl. 159—4 E 5 Claims

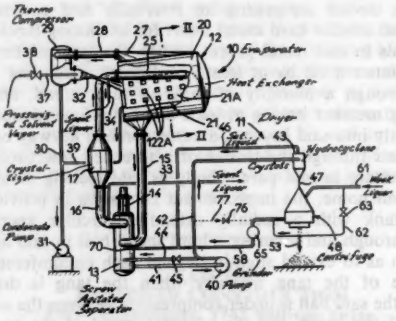


A spray drying device for the production of powders from a liquid suspension comprising a drying chamber with a rotatable atomizer wheel and a set of atomizing nozzles disposed at an appreciable distance from the wheel and atomizing in a direction against the wheel.

3,616,835
EVAPORATORS HAVING HOLLOW, PLATELIKE, VERTICAL HEAT TRANSFER ELEMENTS AND OVERHEAD NOZZLES

Francois Laurenty, Le Touquet, France, assignor of fractional part interest to C.O.C.E.I. S.A., Paris, France

Filed Feb. 11, 1969, Ser. No. 798,339
Claims priority, application France, Feb. 20, 1968, 140,468; Jan. 8, 1969, 6900106
Int. Cl. B01d *1/22*
U.S. Cl. 159—13 B 22 Claims



An installation for the continuous evaporation of a solvent and the continuous concentration of at least one substance in solution in the said solvent, comprising a heat-exchanger which serves at the same time as a heater and as a concentration device, the heat-exchanger comprising a plurality of parallel exchange elements over which a distributor unit causes the solution to be treated to stream, said unit being provided for that purpose with as many nozzles as there are exchange elements.

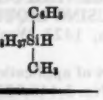
3,616,836

ACCELERATING WATER EVAPORATION BY THE ADDITION OF AN ORGANO-SILICON COMPOUND

Richard W. Alsgaard, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

No Drawing. Filed Aug. 15, 1968, Ser. No. 752,750
Int. Cl. B01d *1/00, 3/34*
U.S. Cl. 159—47 25 Claims

A method for accelerating water evaporation is disclosed in which an aqueous surface is treated with an organosilicon compound. An aqueous surface having an organosilicon compound on the surface is also disclosed. An example of the organosilicon compound is



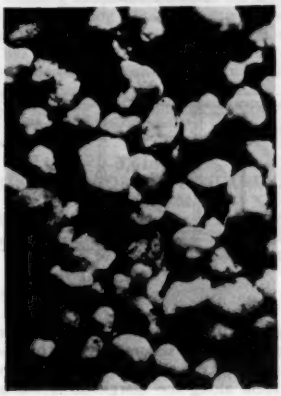
3,616,837

FLUIDIZED BED PROCESS FOR OBTAINING GRANULATED BORIC OXIDE

Paul Mollard, Ste-Foy les Lyon, France, assignor to Ugine Kuhlmann, Paris, France

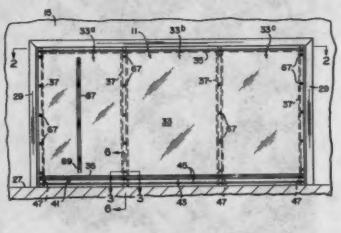
Filed Oct. 16, 1969, Ser. No. 867,013
Claims priority, application France, Oct. 17, 1968, 170,199
Int. Cl. B01d *1/00;* B01l; B01j; F26b *7/00;* C01b *15/12*
U.S. Cl. 159—47 3 Claims

A process for obtaining granulated boric oxide by the dehydration of granulated boric acid comprising placing the granulated boric acid on a diffusion device such as a porous plate and passing a hot air stream through the



device to form a fluidized bed. The hot air stream should have sufficient speed to insure an expansion of the fluidized bed to 150 percent of the volume of the bed at rest.

3,616,838
WEATHER SHIELD MEANS FOR SLIDING DOORS
Samuel J. Barr, 1001 N. Washington Ave., Titusville, Fla.
Filed Nov. 12, 1969, Ser. No. 875,736
Int. Cl. E06b *3/30*
U.S. Cl. 160—90 13 Claims



A weather guard of sheet form plastic in a shield assembly adapted to be detachably secured over a building opening, such as that for patio-type sliding doors, and to be supported in draped relation along the margin to shield against wind driven water so that it does not gain entrance around the edges of a door or a window assembly in the opening. The shield assembly includes a main drape section which is adapted to closely cover the outer side of the sliding door structure and, along the lower edge, a skirt is provided which flares outwardly away from the plane of closure to divert the water away from the threshold of the opening.

3,616,839
GLASS-SILICONE RESIN-STRETCHED ACRYLIC RESIN LAMINATES
Nelson E. Burrin, Fullerton, and Ralph C. Shelton, Buena Park, both of Calif., assignors to Swedlow, Inc., Garden Grove, Calif.
Continuation-in-part of application Ser. No. 437,916, Mar. 8, 1965, now abandoned. This application June 30, 1967, Ser. No. 650,375
Int. Cl. B32b *17/06*
U.S. Cl. 161—193 5 Claims

Transparent laminates comprising at least one external glass sheet and at least one stretched acrylic plastic sheet which are bonded together by a nonrigid, deformable silicone resin interlayer to prevent the difference in the coefficient of thermal expansion between glass and stretched acrylic plastic from causing undesirable structural properties.

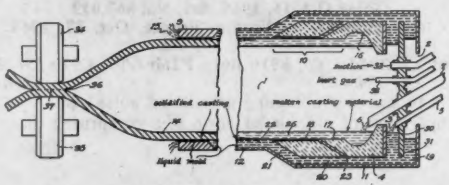
3,616,840
METHOD OF MAKING MULTILAYER SHELL MOLDS
Adam Dunlop, 23 Manse View Terrace, Douglas, Lanark, Scotland
Continuation-in-part of application Ser. No. 760,716, Sept. 18, 1968, now abandoned. This application Jan. 8, 1969, Ser. No. 789,918
Int. Cl. B22c *1/16*
U.S. Cl. 164—26 17 Claims

Shell molds are prepared by applying to a pattern a slurry containing sodium or potassium silicate, removing the pattern from the slurry and coating it with refractory material, and then applying a phosphorus-containing gelling agent. The cycle is then repeated until the desired number of layers are built up on the pattern.

3,616,841
METHOD OF MAKING AN INORGANIC RETICULATED FOAM STRUCTURE
Duane D. Walz, Rancho Cordova, Calif., assignor to Energy Research and Generation, Inc., Oakland, Calif.
Filed Oct. 30, 1967, Ser. No. 679,204
Int. Cl. B22d *25/00*; C04b *35/60*
U.S. Cl. 164—34 10 Claims

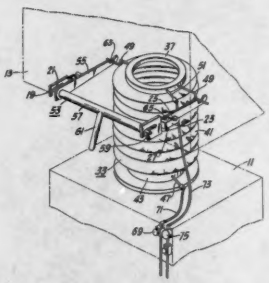
The production of foam material, e.g., a reticulated ceramic, metal or cermet material, is carried out by using commercially available conventional foam, such as reticulated polyurethane, having the desired pattern for the end product. This foam serves as a pattern for the mold and is embedded in mold material of plaster of paris or the like, which sets to form a solid structure in and around the plastic foam. This investment structure is then heated to volatilize and expel the plastic foam, leaving voids in the mold corresponding to the original configuration of the foam. Molten metal or other substance is then cast through the voids or openings in the mold and permitted to cool and set. The mold structure is then washed away, leaving a reticulated structure of integrally formed ligaments of metal, ceramic, cermet or other desired substance.

3,616,842
CONTINUOUS CENTRIFUGAL CASTING OF TUBE USING LIQUID MOLD
George R. Leghorn, 1423 Washington Ave. Apt. 1, Santa Monica, Calif.
Continuation-in-part of application Ser. No. 538,506, Feb. 11, 1966, now Patent No. 3,445,922, dated May 27, 1969. This application Oct. 21, 1968, Ser. No. 768,983
Int. Cl. B22d *11/00, 13/02*
U.S. Cl. 164—84 21 Claims



Continuous centrifugal casting of metal tube on a centrifuged lining of a heavier liquid metal mold, (as lead, tin, or lead-tin alloy). Both the liquid mold material and the molten metal, to be cast to tube, are continuously introduced into the starting end of the centrifuge and continuously exit from the opposite end where the still liquid mold material flows into a suitable catch-ring for recirculation and the semisolidified or solidified centrifugally cast tube exits axially from the centrifuge for subsequent use as tube or as a basic hollow cylinder for conversion to longitudinal structural items by the technique of collapse deformation.

3,616,843
APPARATUS FOR SHROUDING IN A CONTINUOUS CASTING MACHINE
Henry S. Newhall, Allison Park; Walter B. Thomas, Pittsburgh, and Emmanuel V. Gouye, Pittsburgh, all of Pa., assignors to Koppers Company, Inc.
Filed Nov. 25, 1969, Ser. No. 879,739
Int. Cl. B22d *11/10*
U.S. Cl. 164—281 7 Claims



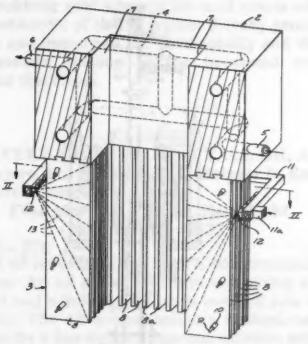
An expandible and retractable enclosure surrounds a molten metal stream of metal teeming from a tundish into a casting mold, and an inert gas under slight superatmospheric pressure is introduced into the enclosure. Method and ap-

paratus are described to expand and retract the enclosure, and also to introduce the inert gas into and to hold the enclosure in an operative position against the tundish and the mold.

3,616,844
APPARATUS FOR CONTINUOUS CASTING OF METAL INGOTS

Klaus Bick, Paderborn; Wolfgang Weinreich, Wilhelmsboehe, and Lothar Harmse, Paderborn, all of Germany, assignors to Paderwerk Gebr. Benteler, Schloss Neuhaus, Kreis, Paderborn, Germany

Division of Ser. No. 661,503, Aug. 16, 1967, Pat. No. 3,515,202.
Filed Feb. 24, 1970, Ser. No. 13,615
Int. Cl. B22d *11/12*
U.S. Cl. 164—283 14 Claims

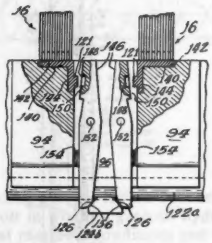


A mold is provided with a mold cavity having an inlet end adapted to receive a stream of molten metal, and an outlet end downstream from the inlet end. Cooling channels for circulation of cooling fluid are provided in the walls of the mold for indirectly cooling the molten metal and causing at least partial solidification thereof so that it will issue from the outlet end as a continuous ingot. A cooling system is arranged downstream of the outlet end and comprises a structure which defines a plurality of elongated slots extending in longitudinal direction away from the outlet end. Each of the slots exposes a longitudinally extending strip-shaped surface portion of the ingot. Means is provided for projecting into each slot against the respective surface portion which is exposed therein at least one jet of coolant fluid which impinges directly onto the surface portion over substantially the entire length of the associated slot.

3,616,845
CASTING STATION FOR BATTERY FABRICATING MACHINE

John E. Farmer, Farmer Mold and Machine Works, Inc., 12034 South Emerald, Chicago, Ill.

Filed July 10, 1968, Ser. No. 743,648
Int. Cl. B22d *17/24, 19/00*
U.S. Cl. 164—333 2 Claims

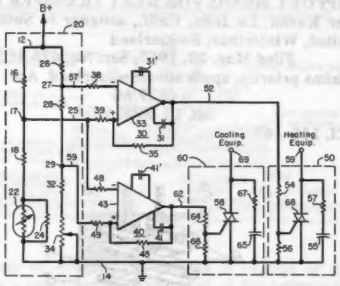


An improved molding station for a battery fabricating machine of the type having an element carrier for transferring battery elements composed of plates and separators between loading, fluxing, casting and unloading stations by means of vertical movement at the stations and rotational movement therebetween, the casting station having cavities therein for molding straps and posts to the lugs of the battery plates, the posts having studlike projections on the face thereof spaced from the straps, characterized in that the casting station has movable mold cavity walls to permit the axial withdrawal of the cast post and strap structure from the cavity as the element carrier is axially lifted at the casting station preparatory to moving to the unloading station.

3,616,846
CONTROL SYSTEM FOR HEATING AND/OR COOLING SYSTEM

Frank E. Wills, York, Pa., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Nov. 17, 1969, Ser. No. 877,318
Int. Cl. F25b *29/00*
U.S. Cl. 165—26 11 Claims

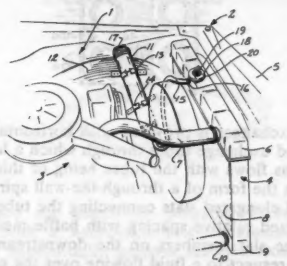


A control system for thermal (heating and/or cooling) equipment is disclosed in two embodiments both of which employ a thermistor to derive a temperature voltage signal and at least two Op-Amp comparator circuits driven by that signal and different reference signals to operate thermal equipment switching means. The first embodiment has only a single stage pair of Op-Amp comparators with the positive of one and the negative input of the other connected to the temperature signal to drive on either heat or cool switching means, but not both at the same time. The second embodiment has two stages of Op-Amps, a first delay and amplifying stage for the temperature signal and a second comparator stage made of a plurality of comparators coupled as in the first embodiment for driving either a heat switch or a cool switch.

3,616,847
VACUUM COMPENSATING DEVICE FOR ENGINE COOLING SYSTEM

Allie B. Holmes, Corpus Christi, Tex., assignor to Opti-Cap Inc., Corpus Christi, Tex.

Continuation-in-part of application Ser. No. 762,254, Sept. 16, 1968, now Patent No. 3,521,702, dated July 28, 1970. This application Jan. 22, 1970, Ser. No. 4,834
Int. Cl. F28b *3/00*
U.S. Cl. 165—51 16 Claims



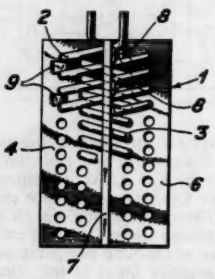
An engine cooling system including a vacuum compensating device in fluid communication with the system. The com-

pensating device maintains the cooling system full at all times and reduces stress on the system. A viewing device is substituted for the usual cap on the radiator filling neck to allow visual determination of the coolant level, and the viewing device seals the radiator. The invention also includes a unique vacuum compensating device including a rigid enclosure and a vacuum and pressure relief valve mounted on the enclosure to maintain pressure in the system within safe, predetermined limits. In the preferred embodiment, the enclosure is elongated, is of a relatively small diameter, and is mounted generally upright so only a small surface area of coolant is exposed to air when the coolant is cold and the vacuum relief valve opens.

ERRATUM

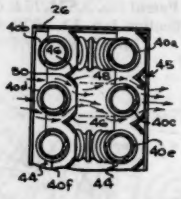
For Class 165—26 see:
Patent No. 3,616,846

3,616,848
SUPPORT MEANS FOR HEAT TRANSFER DEVICE
Werner Kaelin, La Jolla, Calif., assignor to Sulzer Brothers, Limited, Winterthur, Switzerland
Filed Mar. 28, 1967, Ser. No. 626,453
Claims priority, application Switzerland, Apr. 1, 1966, 4829/66
Int. Cl. F28f *9/00*
U.S. Cl. 165—67 **18 Claims**



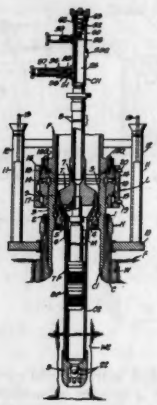
The heat transfer system includes a plurality of wound tube coils fixed within the holes of at least three plates disposed in a radiating axial manner from the axis of the system. The tube coils are wound helically or spirally and are fixed at three points about the holes through which they pass.

3,616,849
HEAT EXCHANGE MEANS
Johannes C. Dijt, 2720 Forsyth Lane, Montgomery, Ala.
Filed Feb. 24, 1970, Ser. No. 13,446
Int. Cl. F28d *7/00*
U.S. Cl. 165—159 **24 Claims**



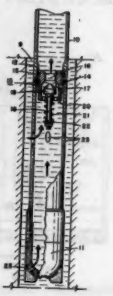
A heat exchanger is provided with horizontally and vertically aligned exchange tubes through which a heat exchange liquid or gas flows with the tubes being of thin-walled construction in the form of a through-the-wall spiral and with a plurality of elongated slats connecting the tube segments to maintain fixed relative spacing with baffle means extending between the slat members on the downstream side of the tubes with respect to a fluid flowing over the exterior of the tubes with the baffles being formed of two arcuately shaped wedge components for directing the fluid flow around the downstream side of the tubes to provide heat flow through substantially the entire tube body with the tubes being arranged in circular array and linear array in two embodiments; in another embodiment the tubes are supported in parallel vertical array so that the external fluid flows along the length of the tubes and a plurality of wave-shaped baffles are mounted between the tubes to direct the gas flow back and forth over the tubes as the flow moves generally along the length of the tubes.

3,616,850
CEMENTING PLUG LAUNCHING MANDREL
Lyle B. Scott, South Gate, Calif., assignor to Byron Jackson, Inc., Long Beach, Calif.
Filed Apr. 20, 1970, Ser. No. 29,973
Int. Cl. E21b *33/16, 33/14*
U.S. Cl. 166—155 **13 Claims**



A cementing plug launching mandrel which includes an annular piston chamber and a piston in the chamber operable by fluid pressure in the mandrel to provide a force to shear the pins which support the cementing plug on the mandrel when a closure carried in the fluid closes the opening through the cementing plug. In addition, the mandrel has a surge chamber to absorb the shock pressure wave caused by closure of the opening through the cementing plug.

3,616,851
SAFETY FILL FLOW CONTROL WELL APPARATUS
Juan A. Garcia, Corpus Christi, Tex., assignor to Esso Production Research Company
Filed Nov. 20, 1969, Ser. No. 878,508
Int. Cl. E21b *33/16*
U.S. Cl. 166—224 **1 Claim**



Apparatus for controlling the flow of fluid into a casing string as the string is being lowered in a well. A valve in the

casing string permits the casing string to fill at an adjustable rate and shuts off flow at a predetermined high flow rate. Frangible means releasably connects the valve to the casing string. A two-plug cementing technique is usable with this apparatus.

3,616,852

OIL RECOVERY PROCESS USING DILUTE ACID

Joseph C. Allen, Bellaire, Tex., assignor to Texaco Inc., New York, N.Y.

Filed Sept. 10, 1969, Ser. No. 856,831
Int. Cl. E21b *43/22, 43/27*
U.S. Cl. 166—271 2 Claims

Recovery of hydrocarbons from a subterranean hydrocarbon-bearing calcareous formation is effected by injecting into the formation via an injection well a dilute aqueous solution of hydrochloric acid and displacing the acid through the formation by injecting an aqueous medium which may comprise dilute hydrochloric acid wherein the acid reacts with the calcareous constituents of the formation thereby generating carbon dioxide and improving the permeability and the porosity of the formation leading to the improved recovery of hydrocarbons therefrom.

3,616,853

OIL RECOVERY PROCESS USING TALL OIL ADDITIVE

Robert C. Ayers, Jr., Houston, Tex., assignor to Esso Production Research Company

Filed Mar. 2, 1970, Ser. No. 15,834
Int. Cl. E21b *43/22*
U.S. Cl. 166—273 8 Claims

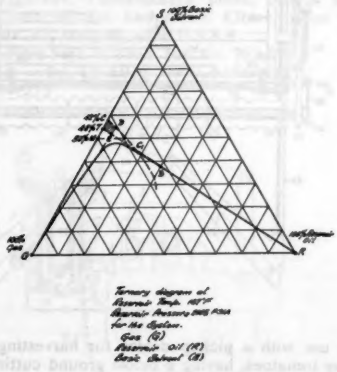
A method of recovering oil from a subterranean oil-bearing formation. An oil solvent mixture containing a polar organic solvent and a tall oil additive is injected into a well and the formation. The oil solvent mixture is displaced through the formation by a low-salinity aqueous solution which is substantially free of surface active agents. Oil which is displaced from the formation by the oil solvent mixture and low-salinity aqueous solution is recovered by means of a well penetrating the formation.

3,616,854

OIL RECOVERY PROCESS

William B. Braden, Jr., Houston, and Joseph C. Allen, Bellaire, both of Tex., assignors to Texaco Inc., New York, N.Y.

Filed Oct. 30, 1969, Ser. No. 872,625
Int. Cl. E21b *43/16, 43/18*
U.S. Cl. 166—274 11 Claims



Ternary diagram of Reservoir Temp. 100°F Reservoir Pressure 1000 PSIA for the System: Gas (G) Reservoir Oil (R) Basic Solvent (B)

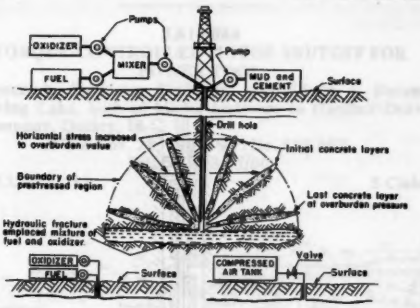
A miscible flooding process for the recovery of oil from an oil-bearing reservoir in which a gaseous hydrocarbon solvent which is gaseous at reservoir conditions and which is capable of forming a zone having no discernible phase change with the reservoir oil, is injected into the reservoir via an injection well and which is thereafter followed by the injection of a dry gas to move the previously injected gaseous hydrocarbon solvent through the reservoir thereby displacing the oil of the reservoir to a production well from which it is produced.

3,616,855

METHOD OF BULKING OR CAVING A VOLUME OF SUBSURFACE MATERIAL

Stirling A. Colgate, Socorro, N. Mex., assignor to New Mexico Tech. Research Foundation, Socorro, N. Mex.

Continuation-in-part of application Ser. No. 691,295, Dec. 18, 1967, now abandoned. This application July 23, 1970, Ser. No. 57,741
Int. Cl. E21b *43/26*
U.S. Cl. 166—283 22 Claims



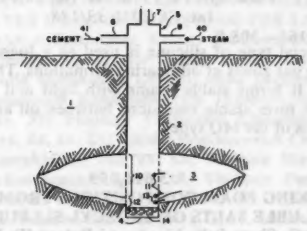
A volume of subsurface material is bulked or caved by generating a gas pressure in the base of the volume in a time of from about 1 to about 10 seconds having an energy input sufficient to lift the overburden material to an extent such that material falls or caves and leaves a chamber having a generally hemispherical roof containing the caved material and providing an interconnected void space. The gas pressure to obtain what may be termed a quasi-static lifting of the overburden material may be generated by shock ignition of a volume-burning propellant, by flame front ignition of a volume-burning propellant, by combustion of an oxidizer and fuel delivered separately and mixed in place in the base of the volume, or by rapid delivery to the base of the volume of a previously stored gas under high pressure.

3,616,856

METHOD OF PLUGGING A WATER-PRODUCING FORMATION

Larry E. Knight, Bakersfield, Calif., and Clyde W. Perry, Kern City, Tex., assignors to Atlantic Richfield Company, New York, N.Y.

Filed Aug. 7, 1970, Ser. No. 61,872
Int. Cl. E21b *33/138, 43/24*
U.S. Cl. 166—288 10 Claims



A method for selectively plugging a wellbore which produces both a hydrocarbonaceous material and water wherein a substantially gaseous material containing water vapor is injected into the wellbore and there is additionally injected a cementitious material which will not set up until reaching the producing formation or formations of the well-

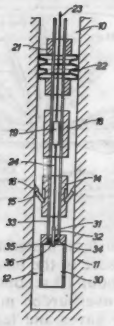
bore, the cementitious material being injected in amounts sufficient to substantially plug the portion or portions of the wellbore by which the water enters.

3,616,857

GEOLOGICAL FORMATION HEATING

Robert Chalmers Pitkethly, Camberley; Denis Henry Desty, Weybridge, and Dennis Mervyn Grist, Twickenham, all of England, assignors to The British Petroleum Company Limited, London, England

Filed Aug. 26, 1969, Ser. No. 853,046
Claims priority, application Great Britain, Sept. 16, 1968, 43,936/68
Int. Cl. E21b *43/24, 43/26*
U.S. Cl. 166—299 **3 Claims**



A petroliferous geological formation in which or just below which a borehole terminates is heated by generating a series of explosion waves at the bottom of the borehole. In a preferred embodiment fuel and oxygen (air) are continuously passed into the borehole, the oxygen and fuel continuously mixed in the vicinity of the end of the borehole so as to form an explosive mixture, and the explosive mixture intermittently ignited so as to generate heat and shock waves which pass to the surrounding formation.

3,616,858

METHOD FOR PLUGGING GAS ZONES WITH SILICONE FOAMS

Syed H. Raza, Tulsa, Okla., assignor to Pan American Petroleum Corporation, Tulsa, Okla.

Filed Apr. 14, 1970, Ser. No. 28,943
Int. Cl. E21b *33/138*
U.S. Cl. 166—305 R **8 Claims**

A special type of silicone is used as a foaming agent for plugging gas zones of oil-bearing formations. The agent is oil-soluble. It forms stable foams with light and heavy oils. It does not form stable emulsions between oil and water. The silicone is of the MQ type.

3,616,859

MAKING FOAM COMPOSITIONS FROM WATER-SOLUBLE SALTS OF UNDECYL SULFURIC ACID

Edward G. Shay, Belle Mead, and Robert W. Bender, Jersey City, both of N.J., assignors to Millmaster Onyx Corporation, New York, N.Y.

Filed Jan. 6, 1969, Ser. No. 789,370
Int. Cl. A62c *1/12*; A62d *1/00*
U.S. Cl. 169—1 A **5 Claims**

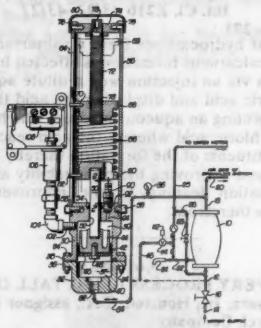
A foam-forming composition containing, as its principal active ingredient, a water-soluble salt of undecyl sulfuric acid, especially the ammonium or alkali-metal salt thereof.

3,616,860

QUICK OPENING DEVICE FOR DRY-PIPE VALVES OF AUTOMATIC SPRINKLER SYSTEMS

Charles F. Willms, Rutherford, N.J., assignor to Norris Industries, Inc., Los Angeles, Calif.

Filed Oct. 6, 1969, Ser. No. 863,985
Int. Cl. A62c *35/00*
U.S. Cl. 169—17 **4 Claims**



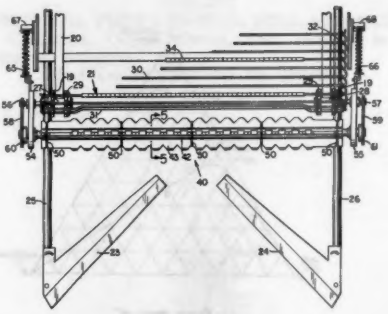
A component for automatic sprinkler systems employed for fire protection is provided which is useful in dry-pipe systems to cause rapid opening of the dry-pipe valve of such systems in response to a slight but rapid decrease of air pressure in the sprinkler piping network attendant upon opening of a sprinkler head. Slow decreases in such pressure in relation to atmospheric pressure are offset by an atmospheric bleed valve, a readily accessible adjustment for altering and visibly indicating the trip-off pressure is provided, and provision is made for either electrical or pneumatic operation.

3,616,861

PICKUP DEVICE FOR ROW-CROP HARVESTING

Thomas S. Bettencourt, Jr., Walnut Grove, Calif., assignor to The Regents of the University of California, Berkeley, Calif.

Filed June 30, 1969, Ser. No. 837,814
Int. Cl. A01d *17/00*
U.S. Cl. 171—101 **11 Claims**



For use with a pickup device for harvesting row crops, such as tomatoes, having a below ground cutting blade followed by a continuous conveyor having a forward end lying rather close to the ground which picks up the harvested plants and carries them rearwardly and upwardly to a separation zone; an assist means lies above the forward end and has a lower surface moving rearwardly. In combination with these, the invention provides a spinner, a rotating bar with a plurality of radially extending flute-edged ridges mounted ahead of and below the forward end of the conveyor and driven at half the speed of the conveyor. Depending upon the

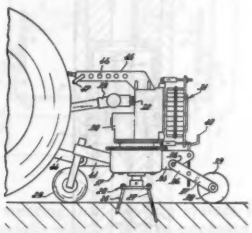
soil conditions, the spinner may ride almost entirely above ground or with most of it below ground. After the knife severs the roots, the spinner lifts up the plant and carries it over and deposits it on top of the conveyor and beneath the assist means. In harvesting in wet soil, the spinner lifts only the plants, leaving detached fruit on the ground, picking up very little mud, and not passing mud on to the conveyor. In dry ground, the spinner may be used at a lower level to pick up the detached fruit from the ground and the fruit on the plants, as well as some loose dirt, and the spacing of the spinner relative to the conveyor is such that all dirt smaller than the fruit being harvested is returned to the soil, whereas the crop, the fruit that was loose, and dirt clods larger than fruit size are carried up the conveyor for later separation.

3,616,862

SOIL-CULTIVATING IMPLEMENTS

Ary Van Der Lely, 10, Weverskade, Maasland, Netherlands

Filed Oct. 23, 1968, Ser. No. 769,937
Claims priority, application Netherlands, Nov. 1, 1967, 6714826
Int. Cl. A01b *33/02, 29/02*
U.S. Cl. 172—47 **7 Claims**



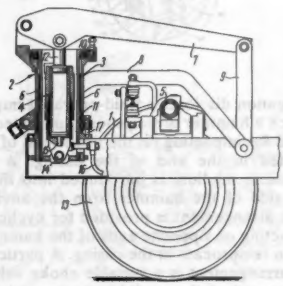
This invention relates to soil cultivating implements comprising a mobile frame and a plurality of soil-working members that are mounted in the frame so as to be rotatable about nonhorizontal axes. The soil-working members can be driven from a common shaft which extends generally transverse to the direction of travel.

3,616,863

SELF-PROPELLED CARRIER

Anatoly Karpovich Volosatov, Volgogradsky prospekt, 99, Korpus 3, kv. 39, Moscow; Georgy Viktorovich Lebedinsky, Kharkov, Sumskaya ulitsa, 9, kv. 6, Kharkov; Nikolai Sergeevich Kabakov, I Institutsky proezd, 4/2, kv. 18, Moscow; Gavriil Mikhailovich Buzenkov, Kutuzovsky prospekt, 30/32, kv. 579, Moscow; Igor Nikolaevich Serebryakov, Kharkov, Pushkinskaya ulitsa, 50/52, kv. 58, Kharkov, and Nikolai Andreevich Kitaev, ulitsa Uchinskaya, 1, kv. 47, Moscow, all of U.S.S.R.

Filed Sept. 9, 1968, Ser. No. 758,295
Int. Cl. A01b *51/00, 63/00*
U.S. Cl. 172—273 **6 Claims**



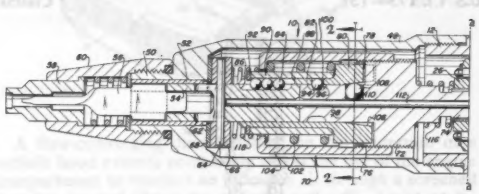
A carrier for moving an agricultural machine comprises a frame including front and rear portions respectively supported on wheels. A four-bar mechanism is provided for mounting and controlling the agricultural machine in working position. The four-bar mechanism includes a hollow cylindrical post which is rotatably supported on the frame. The post has an axis of rotation about which the four-bar mechanism is rotatable and the post is arranged at the front portion of the frame before the axle of the front wheels. One bar of the four-bar mechanism includes means for coupling the agricultural machine thereto and is arranged when in working position above the frame and between the axles of the front and rear wheels. The four-bar mechanism further includes bottom longitudinal bars which are pivotably connected to both the cylindrical post and to the bar coupled to the agricultural machine. There is also provided an upper longitudinal bar which is pivotably coupled to both the cylindrical post and to the bar coupled to the agricultural machine. A power cylinder is arranged inside of the hollow cylindrical post so as to be able to lift and control the mounted agricultural machine.

3,616,864

TORQUE-CONTROLLED MOTOR SHUTOFF FOR POWER TOOL

Clarence A. Sorensen, Fruitport, and Edwin J. Deremo, Spring Lake, both of Mich., assignors to Gardner-Denver Company, Quincy, Ill.

Filed Nov. 28, 1969, Ser. No. 880,663
Int. Cl. B23q *5/00*
U.S. Cl. 173—12 **5 Claims**



A torque-responsive shutoff mechanism for a torque-producing power tool having a valve operable to shut off the flow of motive pressure air to the tool motor. The shutoff valve includes an elongated actuating rod which is releasably held by a plurality of radially spaced balls which are operable to frictionally grip the rod diameter. The gripping ball members are forced into engagement with the rod by a driven member of a torque-sensing device interposed in the drive train of the tool. The driving and driven members of the torque-sensing device include interengaging sloped surfaces which force the members to move axially relative to each other upon reaching a predetermined resistance to rotation. The radially spaced balls contained within a conical recess in the driven member are relieved of their engaging force on the valve-actuating rod upon axial movement of the driven member whereby the shutoff valve is biased to the closed position. The driving and driven members of the torque-sensing device are biased into engagement by a variably compressible coil spring.

3,616,865

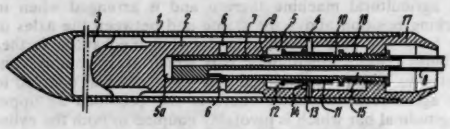
PNEUMATIC PERCUSSION DEVICE FOR MAKING HOLES IN THE GROUND BY PACKING THE LATTER

Boris Vasilievich Sudnishnikov, Krasny prospekt, 56, kv. 59; Alexandr Dmitrievich Kostylev, ulitsa Derzhavina, 19, kv. 44; Konstantin Stepanovich Gurkov, ulitsa Derzhavina, 19, kv. 28; Konstantin Konstantinovich Tupitsyn, ulitsa Krglova, 3, kv. 37; Vladimir Vasilievich Klimashko, ulitsa Novogodnaya, 44, kv. 23; Nikolai Prokhorovich Chepurnoi, prospekt Dzerzhinsho, 28a, kv. 53; Vladimir Maximovich Terin, Mochisechensky, spusk 38; Vladimir Dmitrievich Plavskikh, ulitsa Komenskaya, 84-v, kv. 33; Nikolai Grigorievich Nazarov, ulitsa Gogolya, 3, kv. 10, and Leonid Georgievich Rozhkov, ulitsa Sovetskaya 50, kv. 58, all of Novosibirsk, U.S.S.R.

Filed Feb. 19, 1970, Ser. No. 12,208
Claims priority, application U.S.S.R., Feb. 26, 1969, 1307966
Int. Cl. E21b *1/06*
U.S. Cl. 173—125 **4 Claims**

The invention consists in a pneumatic percussion device for making holes in the ground by packing the latter, com-

prising a striker accommodated in a tapered housing and adapted to deliver impacts upon the housing in the course of its reciprocation under the effect of compressed air intermittently supplied to working chambers of the device by a distributing mechanism formed by an air-supply pipe secured in



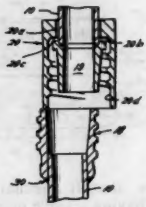
the shank portion of the housing, on which pipe there is set a movable sleeve adapted to overlap one of the inlet apertures of the pipe, and openings in the shank portion of the striker, said openings being overlapped by the pipe during the striker movement.

3,616,866

ARRANGEMENT FOR ALIGNING AND CONNECTING SECTION OF CYLINDRICAL MEMBERS

Kees M. Verheul, P. O. Box 9582, Houston, Tex., and Howard I. Lorenz, 518 Ripple Creek, Houston, Tex.

Filed July 18, 1969, Ser. No. 843,154
Int. Cl. E02d *5/28*
U.S. Cl. 173—131 **7 Claims**



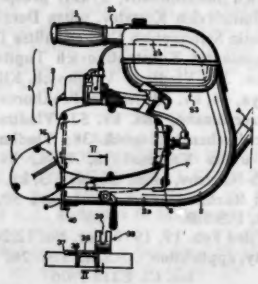
An arrangement including a connecting sleeve whereby adjacent sections of cylindrical members such as columns, casing, piling, cassions, and other cylindrical members may be readily connected together and then driven into the earth from a location on land or from a fixed structure in a water-covered area or floating structure such as a floating platform, barge, structure, or ship. The aligning and connecting sleeve enables adjacent cylindrical sections or members to be readily aligned and connected together for subsequent driving into the ground.

3,616,867

POWER UNIT FOR GARDEN APPLIANCES AND THE LIKE

Alfredo Celli, Via Senio, Forli, Italy

Filed May 14, 1970, Ser. No. 37,240
Claims priority, application Italy, May 16, 1969, Apr. 11, 1970, 51876 A/69 68229A/70
Int. Cl. B27c *3/08*
U.S. Cl. 173—163 **6 Claims**



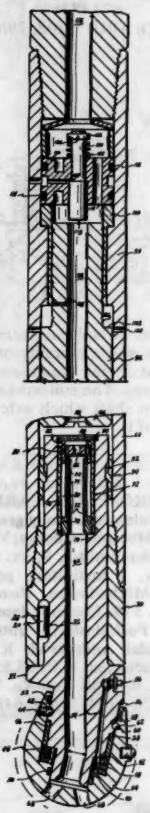
A motor unit for driving a machine or tool such as a gardening tool has small stroke internal combustion engine mounted on a tubular frame which has provision for attachment of an extension handle—for example, when using the unit to power a lawnmower. The engine is coupled to an output shaft for power takeoff to the machine or tool by way of transmission means including a speed reducer which is selectively engageable. The tubular frame is provided with rapid attachment means for connection of the motor unit to the machine or tool to be driven.

3,616,868

FLUID-ACTUATED IMPACT TOOL AND ANVIL DEVICE HAVING VARIABLE CHOKE

Grey Bassinger, Bedford, Pa., assignor to Rand Engineering Corp., San Antonio, Tex.

Filed Jan. 13, 1970, Ser. No. 2,527
Int. Cl. E21b *5/00*
U.S. Cl. 175—92 **30 Claims**



The specification discloses a fluid-operated impact-drilling device in which a hammer is reciprocally mounted in a casing and is adapted for impacting on the upper end of an anvil-bit device mounted in the end of the casing. A continuous supply of pressure medium is introduced into the casing on the opposite side of the hammer from the anvil-bit device and any valve arrangement is provided for cyclically varying the pressure acting on opposite ends of the hammer to cause the hammer to reciprocate in the casing. A particular feature of the valve arrangement is a variable choke valve mounted in the hammer end of the anvil-bit device and arranged to offer greater restriction to flow through the anvil-bit device during retracting movement of the hammer and a lesser restriction of flow during advancing movement of the hammer. The anvil-bit device may comprise a conventional bit on the outer end or it may comprise a ball-like bit

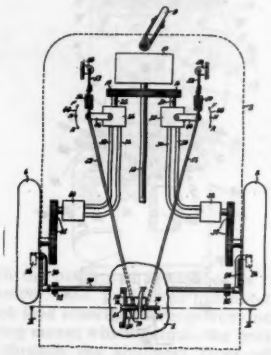
member rotatable on an inclined shaft connected to the anvil-bit device.

3,616,869

PROPULSION, STEERING, AND BRAKING SYSTEM FOR VEHICLES

Raymond J. Rilling, Moundridge, Kans., assignor to Excel Industries, Inc., Hesston, Kans.

Filed Oct. 13, 1969, Ser. No. 865,729
Int. Cl. B62d *11/04*
U.S. Cl. 180—6.48 1 Claim



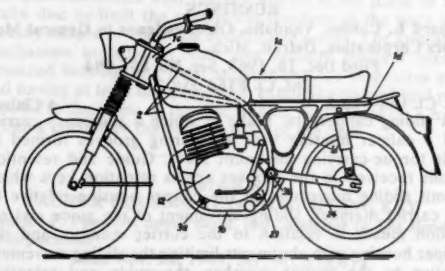
A propulsion, steering, and braking system for a vehicle having a pair of axially aligned ground-engaging wheels, said system including a prime mover, a pair of hydraulic pumps driven by said prime mover and each operable to drive a hydraulic motor to turn one of said wheels, each hydraulic pump having a control lever having a neutral position in which its delivery rate is zero and being movable selectively in opposite directions from said neutral position to cause operation of the associated motor in relatively opposite directions, manual means for moving said control levers, manually operable brake means for both of said wheels, and means operable by application of said brake means to return both of said control levers to their neutral positions.

3,616,870

SUSPENSION ARRANGEMENT FOR TWO-WHEELED MOTOR VEHICLE

Dieter Kramer, Egmating, Germany, assignor to Zundapp-Werke Gesellschaft mit beschrankter Haftung, Munich, Germany

Filed Mar. 19, 1970, Ser. No. 21,145
Claims priority, application Germany, Apr. 24, 1969, P 19 20 750.2
Int. Cl. B60k *5/12*
U.S. Cl. 180—32 2 Claims



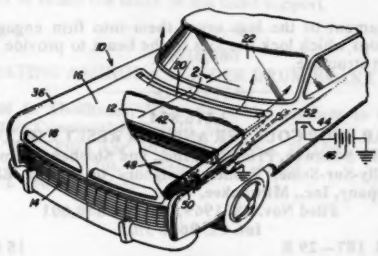
Two-wheeled motor vehicle with a motor and transmission block suspended at least at two different points of the vehicle frame, where the suspension at the rear and the points of connection of the swinging arm of the rear wheel are disposed at a common pivot axis and where a bearing pin extends through two axially spaced bearing sockets and the rearward suspension for the motor and transmission block is arranged centrally of the pin between the two sockets to the two sides of which the linking joints of the swinging arm of the rear wheel is rotatably and elastically journaled and the entire bearing means can be radially and axially stressed or tensioned.

3,616,871

VEHICLE BUG DEFLECTOR

Shannon V. West, Pensacola, Fla., assignor to J. B. Hopkins, Pensacola, Fla., a part interest

Filed Nov. 12, 1969, Ser. No. 875,666
Int. Cl. B60j *1/20*; B60k *11/06*
U.S. Cl. 180—54 A 4 Claims



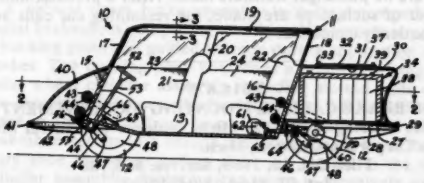
A flow-converging duct mounted on the underside of a vehicle hood extends completely across the top of the engine compartment to conduct an inflow of air through a screened opening located above the radiator and grill. Air at an increased velocity is discharged upwardly from the exhaust opening of the duct in front of the windshield to establish an air curtain deflecting debris and insects that would otherwise obstruct vision.

3,616,872

ELECTRIC AUTOMOBILE

Frank A. Taylor, 236 Australian Ave., Palm Beach, Fla.

Filed Aug. 11, 1969, Ser. No. 848,795
Int. Cl. B60l *11/18*
U.S. Cl. 180—65 R 3 Claims



A motor vehicle driven by one or more electric motors supplied with power from a plurality of rechargeable energy cells which are permanently encased within the body structure. An auxiliary source of power is provided to recharge one of the energy cells while another energy cell is supplying power to the electric motor.

3,616,873

FOLDAWAY SAWHORSE

John Kehrig, 28151 Hall, Mount Clemens, Mich.

Filed Jan. 14, 1970, Ser. No. 2,811
Int. Cl. E04g *1/32*; F16m *11/00*
U.S. Cl. 182—155 8 Claims

A sawhorse with an inverted U-shaped work support beam with two pairs of legs pivotally connected thereto to fold between the sides of the support beam. The legs can swing

outwardly from the collapsed or folded position to an extended position and be angularly displaced away from each other by a spreader bar between each pair of legs. Angular

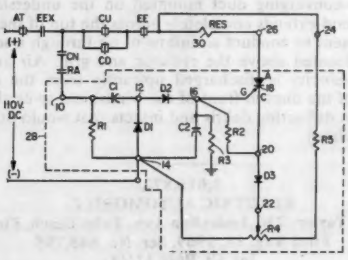
displacement of the legs urges them into firm engagement with stops which lock the legs to the beam to provide a rigid support structure.

3,616,874

CAR STOP COUNTER AND CAR RESET CIRCUIT

James H. Stichweh, Princeton, Ind., and Stephen A. Hornung, Neuilly-Sur-Seine, France, assignors to Armor Elevator Company, Inc., Milwaukee, Wis.

Filed Nov. 28, 1969, Ser. No. 880,601
Int. Cl. B66b *5/02*
U.S. Cl. 187—29 R **15 Claims**



A circuit includes a charging means to sense the number of stops made by an elevator in response to car calls at which there are no passenger transfers made. After a predetermined number of such stops are made, the remaining car calls are automatically cancelled.

3,616,875

DISC BRAKE CALIPER MOUNTING ARRANGEMENT

Neil M. Lottridge, Saginaw, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 16, 1969, Ser. No. 866,908
Int. Cl. F16d *65/04, 55/10*
U.S. Cl. 188—73.3 **1 Claim**

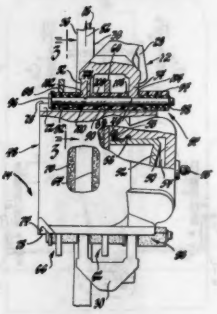
A sliding brake caliper for a disc brake is mounted by means of a tongue-and-groove arrangement between the arcuately spaced ends of a nonrotatable mounting bracket so that the caliper is retained against movement radially and arcuately relative to the disc, while permitting sliding movement transversely of the disc to maintain caliper adjustment. An antirattle and antifriction plastic shim arrangement is provided between the caliper housing and the mounting bracket surfaces.

3,616,876

SLIDING CALIPER DISC BRAKE AND GUIDE AND RETENTION MEANS THEREFOR

Frank W. Brooks, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 18, 1969, Ser. No. 886,217
Int. Cl. F16d *65/02*
U.S. Cl. 188—73.3 **10 Claims**



A sliding caliper disc brake in which a stationary carrier and a caliper housing have registering grooves formed in their torque-carrying abutment faces. Guide and retention means received in the grooves act as retention keys which permit sliding movement of the caliper housing relative to the carrier member, sliding movement of the guide and retention means in relation to the carrier member and the caliper housing with abutments limiting the sliding movement relative to the carrier member, the guide and retention means also mounting the brake pad assemblies in the caliper housing for sliding movement. Each guide and retention means includes a sleeve member with a pin inserted axially through the sleeve to hold the brake assembly together. With only the sleeve member in place, the brake pad assemblies are held in the caliper housing and the caliper housing can be later installed in position on the carrier member with the brake pad assemblies in place. When the pin is inserted, the caliper housing, together with the brake pad assemblies, is retained against radial movement. The guide and retention means has a resilient shock load absorbing arrangement which permits the brake torque to be transmitted through the abutment faces while preventing radial movement and undamped torque transfer.

3,616,877

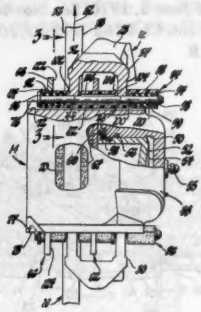
SLIDING CALIPER DISC BRAKE AND GUIDE AND RETENTION MEANS THEREFOR HAVING RESILIENT BUSHINGS

Richard L. Collins, Vandalia, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 18, 1969, Ser. No. 886,084
Int. Cl. F16d *65/02*
U.S. Cl. 188—73.3 **4 Claims**

A sliding caliper disc brake in which a stationary carrier and a caliper housing have registering grooves formed in their torque-carrying abutment faces. Guide and retention means received in the grooves act as retention keys which permit sliding movement of the caliper housing relative to the carrier member, sliding movement of the guide and retention means in relation to the carrier member and the caliper housing with abutments limiting the sliding movement relative to the carrier member, the guide and retention means also mounting the brake pad assemblies in the caliper housing for sliding movement. Each guide and retention means includes a sleeve member with rubberlike bushings therein, and a pin inserted axially through the sleeve and the

bushings to hold the brake assembly together. With only the sleeve member in place, the brake pad assemblies are held in the caliper housing and the caliper housing can be later installed in position on the carrier member with the brake pad assemblies in place. When the pin is inserted with the caliper assembly in place on the carrier, the caliper housing,



together with the brake pad assemblies, is retained against radial movement. The guide and retention means has a resilient shock load absorbing arrangement including the rubberlike-bushing means which permits the brake torque to be transmitted through the abutment faces while preventing radial movement and undamped torque transfer.

3,616,878

ANTIRATTLE SYSTEM FOR DISC BRAKE

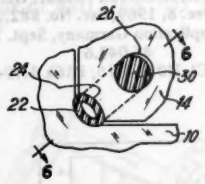
Jean-Claude Girauldon, Ponthierry, France, assignor to Societe Anonyme D.B.A.

Filed Oct. 1, 1969, Ser. No. 862,755

Claims priority, application Frace, Oct. 3, 1968, Mar. 21, 1969, 168,641, 6908288

Int. Cl. F16d *65/02*

U.S. Cl. 188—73.5 **3 Claims**



The following relates to an antirattle system for use in a caliper-type disc brake which restraint movement of the friction pad assemblies with respect to and in the plane of the brake disc to limit the vibrational freedom of the pads and thereby reduce or eliminate undesirable noises. The antirattel mechanism includes at least one radially resilient tubing squeezed between the fixed support and the respective pad and having at least one projection extending toward said pad parallel to the plane of the disc to affix said tubing on a bare of lining portion of the backing plate of the pads.

3,616,879

CALIPER HOUSING RETAINING SPRING KEY

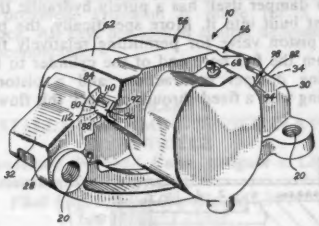
Maurice P. Pauwels, South Bend, Ind., assignor to The Bendix Corporation

Filed Nov. 20, 1969, Ser. No. 878,475

Int. Cl. F16d *55/18, 65/00*

U.S. Cl. 188—73.6 **8 Claims**

A disc brake including a fixed support having a pair of circumferentially spaced arms defining a recess therebetween. Each of the arms has an axially extending groove formed therein which slidably receives a projecting ledge on a caliper which is slidably supported in the recess by the arms.



Removable keys are carried in the grooves that engage the caliper to retain the latter on the fixed support.

3,616,880

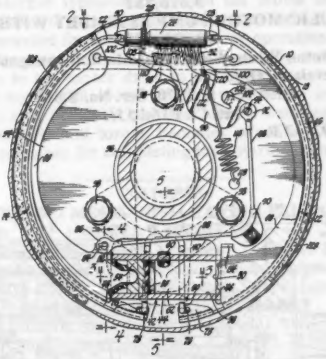
FLOATING ANCHOR-CYLINDER DRUM BRAKE WITH ADJUSTER

Ronald L. Shellhause, Vandalia, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 20, 1970, Ser. No. 30,120

Int. Cl. F16d *51/52, 51/24*

U.S. Cl. 188—79.5 GC **4 Claims**



A vehicle drum brake assembly including stamped sheet metal brakeshoes comprising double web members straddling a backing plate and guided thereon during application of the brakes. The backing plate comprises a notch receiving a tubular wheel cylinder assembly including slotted ends which are loosely fitted upon the backing plate for limited movement in the notched-out area. Engagement of the primary brakeshoe results in a torque reaction passing from the primary shoe to the secondary shoe and thence to the wheel cylinder assembly displacing the same to positively engage the slots with the backing plate and provide a positive anchor for the brakeshoes while the brakes are being applied. The relatively loose fit of the wheel cylinder within the notch of the backing plate accommodates thermal expansion and any variations in distortion of the drum so that the brakes are uniformly applied during all operative conditions.

3,616,881

TRAILER TOW BAR DAMPERS

Lawrence G. Nicholls, Birmingham, England, assignor to Girling Limited

Filed Oct. 8, 1969, Ser. No. 864,802

Claims priority, application Great Britain, Oct. 14, 1968, Oct. 31, 1968, 48,603/68, 51,641/68

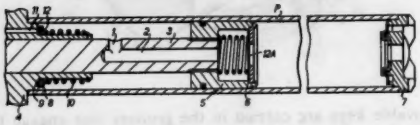
Int. Cl. F16f *9/49*

U.S. Cl. 188—282 **7 Claims**

The invention is an hydraulic, telescopic damper of the piston and cylinder type designed primarily for use in trailer

tow bar couplings of the type which includes means for applying the trailer brakes in response to trailer overrun.

Instead of the usual mechanical threshold device employed in such coupling to prevent undesired trailer brake applications, the damper itself has a purely hydraulic threshold arrangement built into it. More specifically, the piston has a one-way piston valve for permitting relatively free flow of liquid from the full bore end of the cylinder to the annulus end during damper contraction, and a piston rod port cooperating with a fixed shroud to check this flow during the



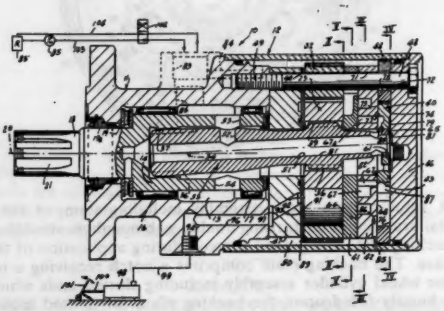
first stage of damper contraction from the fully extended (towing) condition. In this first phase, the only escape route for liquid is through a base valve at the full bore end of the cylinder. This base valve has a higher resistance to liquid flow than the piston valve, with the consequence that it creates a high threshold resistance to damper contraction. Once the piston port is uncovered, the resistance is reduced. Preferably, a permanently open control orifice is also provided to restrict the flow of liquid out of the annulus end during damper extension.

3,616,882

HYDRAULIC MOTOR-PUMP ASSEMBLY WITH BUILT-IN BRAKE

Harvey Clinton White, West Lafayette, Ind., assignor to TRW Inc., Cleveland, Ohio

Filed Feb. 5, 1970, Ser. No. 8,860
Int. Cl. F16d *55/12*
U.S. Cl. 192—3 R **4 Claims**



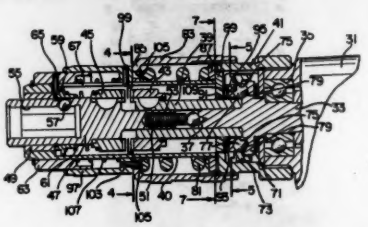
A hydraulic motor-pump assembly having an axial chamber formed therein, a pair of axially spaced stationary radial wall members within the chamber, a pair of relatively rotationally and orbitally movable gear members disposed within the chamber between the radial wall members to form expanding and contracting fluid pockets between the teeth thereof and various fluid ports and passages for directing fluid through the housing and to and from the respective fluid pockets in synchronism with the relative movement of the gear members. A work input-output shaft is connected for joint rotation to one of the gear members. A nonrotatable flexible disc-shaped braking plate is disposed within the chamber between the rotatable one of the gear members and one of said radial wall members. A fluid pressure chamber is formed behind the braking plate in said one radial wall member. A fluid passage is formed in the housing for connecting the pressure chamber to a source of pressurized fluid to selectively urge the braking plate into tight frictional gripping relation with the rotatable gear member thereby braking or locking the gear member against rotation.

3,616,883

ADJUSTABLE CLUTCH

William F. Sindelar, Towson, Md., assignor to The Black and Decker Manufacturing Company, Towson, Md.

Filed June 8, 1970, Ser. No. 44,049
Int. Cl. F16d *7/00, 43/20*
U.S. Cl. 192—56 R **14 Claims**



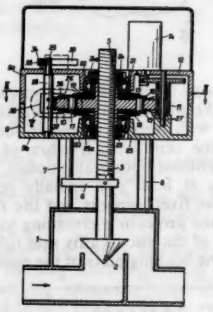
A portable-powered tool for driving screws and the like which includes a housing having a motor therein. An output rotary member is connected to the motor by a positive clutch (actuated when the tool is coupled to a workpiece) and a releasable clutch adapted to slip at a predetermined torque level. The releasable clutch adapted to slip at a predetermined torque level. The releasable clutch includes a novel construction to facilitate efficient operation and long life, and is readily adjustable by means disposed externally of the housing.

3,616,884

POWER-DRIVEN POSITIONING SYSTEM WITH INTERRUPT MEANS UPON APPLICATION OF A PREDETERMINED POSITIONING FORCE AT END POINTS OF TRAVEL, PARTICULARY FOR VALVES AND THE LIKE

Jurgen Balz, Heilbronn/Neckar, Germany, assignor to Firma Helmut Balz GmbH, Heilbronn Neckar, Germany

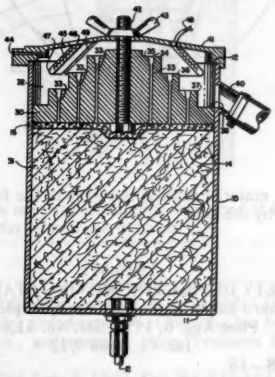
Filed Dec. 8, 1969, Ser. No. 882,975
Claims priority, application Germany, Sept. 11, 1969, P 19 46 043.6
Int. Cl. H01h *3/16;* **F16k** *31/04*
U.S. Cl. 192—141 **14 Claims**



A rotatable positioning member driven, for example by a gear, from a motor, axially moves a threaded spindle. The positioning member is held between a pair of bowed disc springs, for limited axial excursion against the force of the disc springs. Wen an end position is reached, the positioning member will travel axially against one of the disc springs, thereby frictionally engaging a camming disc, concentric with

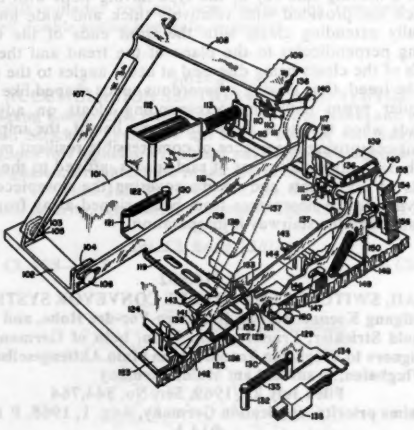
the disc spring, the camming disc operating a projecting lever which moves a switch to cut power, so that terminal positions of the spindle (to which a valve stem can be connected) will be applied with force determined by bias on the spring discs.

3,616,885
OIL RECLAIMER
Glen R. Priest, 1802 Floyd, Lawton, Okla.
Filed Dec. 2, 1970, Ser. No. 94,459
Int. Cl. B01d *3/28*; C10g *7/00*
U.S. Cl. 196—128 7 Claims



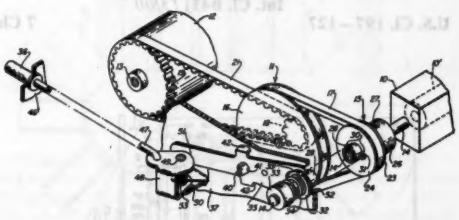
Disclosed is a device comprising a canister containing a filter and an evaporation plate. The evaporation plate is basically a truncated cone with a plurality of annular concentric flat horizontal surfaces. Oil is forced through the filter and the evaporation plate into an evaporation chamber where volatile contaminates are removed by vaporization.

3,616,886
COMPACT LOW SILHOUETTE KEYBOARD MECHANISM
Hugh St. Lawrence Dannatt, Rochester, N.Y., assignor to The Singer Company
Filed July 2, 1969, Ser. No. 838,539
Int. Cl. B41j *23/08*, *7/02*, *5/14*
U.S. Cl. 197—17 26 Claims



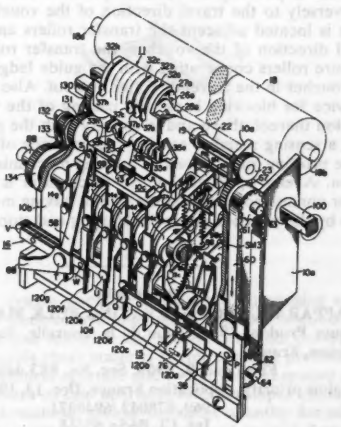
A plural key keyboard having a parallelogram four-bar linkage which provides equal key dip for all keys irrespective of row or distance from the operator. The mechanism is very compact and the components are densely packed giving minimum dimensions from front to rear and top to bottom. Access to inner components is provided by means of a swing away subassembly which includes the key buttons and immediately associated linkage. Antirepeat and interlock features are provided. Provision is made for a selective keyboard lock. All keys are locked against depression when power is disconnected.

3,616,887
MOTOR STALL OVERCOMING DEVICE IN A POWER TYPEWRITER
Larry H. Anderson, Portland, Conn., assignor to Litton Business Systems, Inc., New York, N.Y.
Filed Aug. 6, 1969, Ser. No. 847,971
Int. Cl. B41j *23/08*
U.S. Cl. 197—17 2 Claims



In an electric typewriter wherein the motor is liable to become stalled if two or more mechanisms become inadvertently connected for concomitant power operation, a device is manually operable for effecting temporarily a mechanical disruption in the motor drive to allow the armature of the motor to regain full speed running momentum and torque and when said device is restored after a time interval, the said momentum and torque becomes effective on the connected mechanism for completing their started operations.

3,616,888
TYPEWRITING MECHANISM HAVING PLURAL TYPE WHEEL TYPE HEAD
Reijiro Kawano; Masatsugu Arakawa; Yoshinari Fujishima, and Yoshio Tanaka, all of Tokyo, Japan, assignors to Kurosawa Tele-communications Limited, Tokyo, Japan
Filed Sept. 3, 1968, Ser. No. 759,260
Claims priority, application Japan, Sept. 1, 1967, Sept. 1, 1967, Sept. 1, 1967, 42/56,296, 42/56,297, 42/56,298
Int. Cl. B41j *1/44*
U.S. Cl. 197—18 2 Claims



A typewriter mechanism which uses a plurality of type wheels with the characters thereon. The type wheels are posi-

tioned in a type wheel head which is actuated by an axial selector means and a rotation selector means. The selector means and the type wheel head are mounted on a movable carriage frame such that the type wheel heads and the selector means are positioned with respect to the typewriter platen. Each selector is operated by a separate lever mechanism which is in turn operated by electromagnet means through a connecting means. The electromagnet means are operated in accordance with a binary coded input signal.

3,616,889

DEVICE FOR FEEDING VOUCHERS TO A PRINTING LOCATION IN A VOUCHER-PRINTING BOOKKEEPING MACHINE OR THE LIKE

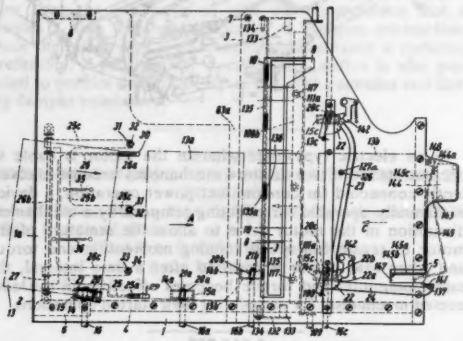
Reinhard Kley, Ubbedissen, Germany, assignor to Anker-Werke AG, Bielefeld, Germany

Filed Dec. 1, 1967, Ser. No. 687,271

Claims priority, application Germany, Dec. 2, 1966, A 54251

Int. Cl. B41j *13/00*

U.S. Cl. 197—127 **7 Claims**



Apparatus for drawing in manually disoriented vouchers of varying dimensions to a bookkeeping machine and automatically positioning them so that they are imprintable at a location always having the same spacing from two edges thereof includes a voucher blocking and adjusting device controllable by the voucher per se and having a plurality of transfer rollers located separate from one another above a printing table, and a plurality of voucher pressure rollers extending transversely to the travel direction of the voucher. A guide ledge is located adjacent the transfer rollers and extends in travel direction of the voucher, the transfer rollers and the pressure rollers cooperating with the guide ledge for feeding the voucher in the travel direction thereof. Also included are a device for blocking backward passing of the voucher at a location thereof above and in registry with the printing location, a sensing member sensing the presence of the voucher at the printing location, and a printing mechanism at that location. A cam-operated control mechanism is driven by a motor connected in an electric circuit having means controllable by the voucher per se for starting and stopping the motor.

3,616,890

APPARATUS FOR ELEVATING BULK MATERIAL

Jacques Pradon, 19, Avenue de la Tourelle, Saint-Maur-Des Fosses, France

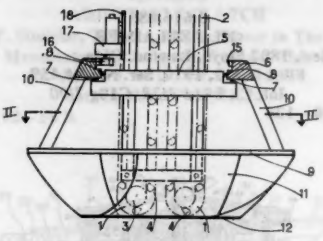
Filed Dec. 9, 1969, Ser. No. 883,446

Claims priority, application France, Dec. 13, 1968, Nov. 27, 1969, 178043, 6940871

Int. Cl. B65g *65/28*

U.S. Cl. 198—9 **4 Claims**

A bulk-material-elevating apparatus which includes an arm suspended from a lifting device, the arm at its lower end having a rotatable element carrying blades which in operation



will deliver material radially inwardly to the foot of an elevator carried by the arm.

3,616,891

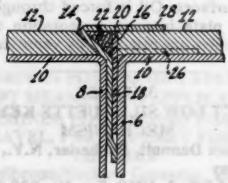
SAFETY DEVICE FOR MOVING STAIRWAYS

Henry Leonard Earle, 18 Colgate Road, Maplewood, N.J.

Filed Aug. 6, 1970, Ser. No. 61,651

Int. Cl. B66b *9/12*

U.S. Cl. 198—16 **3 Claims**



In a moving stairway of the type having steps with treads which are provided with relatively thick and wide longitudinally extending cleats with the front ends of the cleats being perpendicular to the plane of the tread and the rear ends of the cleats being disposed at acute angles to the plane of the tread, thus leaving a hazardous space shaped like a triangular prism between corresponding cleats on adjacent treads when the steps are at the same height, the improvement comprising nosepieces of compressible resilient material, having shapes like that of said spaces, affixed to the front ends of said cleats and means covering the nosepieces for preventing the nosepieces from being ripped away from the cleats when the stairway is in operation.

3,616,892

RAIL SWITCHES FOR PALLET CONVEYOR SYSTEMS

Wolfgang Koennecke, bad Homburg Vor-der Hohe, and Reinhold Strickler, Frankfurt am Main, both of Germany, assignors to Flughafen Frankfurt am Main Aktiengesellschaft, Flughafen, Frankfurt am Main, Germany

Filed July 25, 1969, Ser. No. 844,764

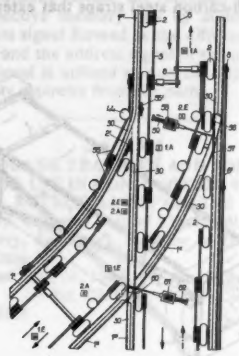
Claims priority, application Germany, Aug. 1, 1968, P 17 56 914.1

Int. Cl. B65g *37/00*

U.S. Cl. 198—78 **5 Claims**

A switching mechanism for conveyors of the type wherein a pair of parallel rails guides a series of pallets supported and

moved on a series of fixed-axis wheels includes movable guide tongues for diverting a pallet on to a side track or vice



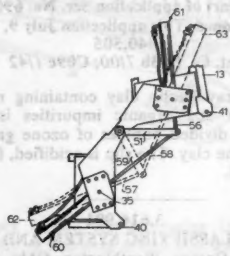
versa. The rails may also be slightly displaced at the switch to facilitate transfer from track to track.

3,616,893

MOBILE HYDRAULICALLY FOLDABLE CONVEYOR

Orlin L. Knadle, and August W. Ollerich, Jr., both of Sioux Falls, S. Dak., assignors to Athey Products Corporation, Raleigh, N.C.

Filed Apr. 3, 1969, Ser. No. 813,152
Int. Cl. B65g *21/12*
U.S. Cl. 198—115 **1 Claim**



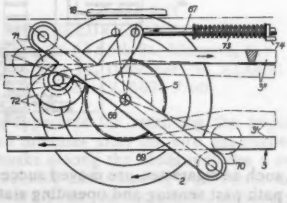
A mobile folding conveyor has a main central section and a pair of pivotally mounted, completely foldable, end sections each of which is positioned through independently movable cylinder rod and arm linkages by remotely controlled double acting hydraulic cylinders.

3,616,894

ACCUMULATION SECTION FOR A CONVEYOR

Wolfgang Koennecke, Bad Homburg Vor-der Hoke, and Reinhold Stricker, Frankfurt am Main, both of Germany, assignors to Flughafen Frankfurt am Main Aktiengesellschaft Flughafen, Frankfurt am Main, Germany

Filed July 25, 1969, Ser. No. 844,792
Claims priority, application Germany, Aug. 1, 1968, P 17 56 915.2
Int. Cl. B65g *13/02*
U.S. Cl. 198—127 **6 Claims**



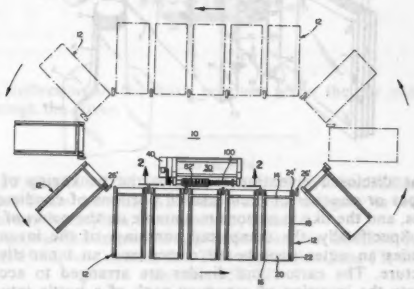
The invention relates to a conveyor system in which a series of pallets are moved on rails by means of individual driving wheels spaced along the track for frictional engagement with the underside of the pallets; a lever system is used to engage the individual wheels with a common belt drive power source or to brake the individual wheels when not being driven.

3,616,895

CONVEYOR BELT INDEXING MECHANISM

Roy F. LoPresti, Chicago, Ill.; Milan Vojtek, Elmhurst, N.Y., and Edwin A. Peterson, Manhasset, N.Y., assignors to United Parcel Service General Services Co., New York, N.Y.

Filed Mar. 23, 1970, Ser. No. 21,915
Int. Cl. B65g *15/00*
U.S. Cl. 198—185 **21 Claims**



A mechanism for indexing conveyor belts in boxes of carousel-type cargo carriers, comprising a driven shaft slidably and rotatably mounting a resilient-surfaced drive member, which drive member is biased for sliding movement toward one end of the shaft. The drive member, in cross section, has a substantially circular segment of circumference, and at least one substantially flat such segment.

ERRATUM

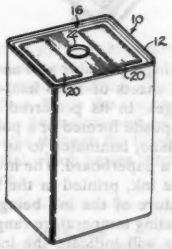
For Class 204—196 see:
Patent No. 3,617,101

3,616,896

COOLING SYSTEM PACKAGE

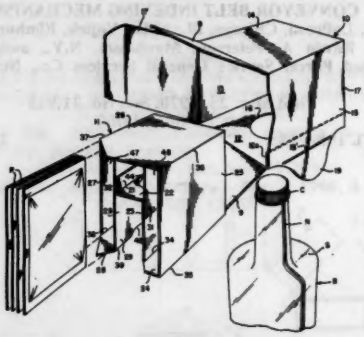
Frederic D. Barton, 47736 Ahuimanu Loop, Kaneohe, Hawaii

Filed July 15, 1969, Ser. No. 841,788
Int. Cl. B65d *79/00*
U.S. Cl. 206—47 R **1 Claim**



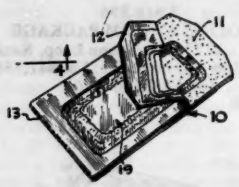
A cooling system package is disclosed comprising a first container of antifreeze liquid and a separate second container of stop leak material, said second container comprising a body of flexible sheet material having a center portion provided with a central aperture and two envelopes spaced apart on opposite sides of said aperture, said envelopes containing said stop leak material and in sufficient quantity for admixture with the amount of antifreeze liquid in said first container, and means for affixing said second container to the top of said first container to maintain them together during shipment and storage so that they may be admixed in a cooling system at the point of use.

3,616,897
BOTTLE MOUNTABLE POUCH CONTAINER
George Vrana, Flushing, N.Y., assignor to Riegel Paper Corporation, New York, N.Y.
Filed Sept. 24, 1969, Ser. No. 860,731
Int. Cl. B65d *79/00, 5/48*
U.S. Cl. 206—47 R 5 Claims



The disclosed invention relates to the packaging of envelopes or pouches of premeasured portions of condiments, mixes, and the like in cartons mountable on the necks of bottles. Specifically, the completed container of the invention includes an outer paperboard carton and an inner divider structure. The carton and divider are arranged to accommodate the insertion of a narrow neck of a bottle into the carton through an aperture in its bottom wall. The divider includes discrete elements which grippingly engage the inserted bottle neck. Both the divider and the carton may be quickly erected from flat folded form for filling with pouches and mounting on bottles intended for open display.

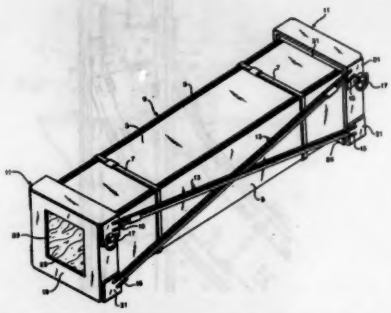
3,616,898
PEELABLE SEAL PACKAGE
Adrian B. Massie, Williamsville, N.Y., assignor to Abbott Laboratories, North Chicago, Ill.
Filed Sept. 8, 1969, Ser. No. 855,890
Int. Cl. B65d *83/00, 85/70, 65/14*
U.S. Cl. 206—56 AA 6 Claims



A package having a peelable seal and constructed of a pair of superimposed sheets or films heat-sealed to one another around their edges. In its preferred embodiment, the film comprises a composite formed of a polyolefin, such as a low-density polyethylene, laminated to an ionomer film which is in turn sealed to a paperboard. The invention includes a temperature-sensitive ink, printed in the heat seal area, the activation temperature of the ink being selected in the lower portion of the sealing temperature range so that upon sealing, the color change will indicate the integrity of the package heat seal. The invention is particularly useful for sterile pharmaceutical packages in order to visibly indicate effective seals.

3,616,899
PACKAGING STRUCTURE
Paul Blackman, 7252 Hanford St., Philadelphia, Pa.
Filed Sept. 9, 1969, Ser. No. 856,412
Int. Cl. B65d *85/46*
U.S. Cl. 206—60 R 1 Claim

Subject disclosure relates to novel and improved apparatus for handling, shipping and storing elongated flat rectangular modular sections of an aircraft landing mat. The improved apparatus includes a pair of frame members that fit over opposite ends of a stacked bundle of aircraft mat sections and a plurality of high-carbon steel straps that extend between the

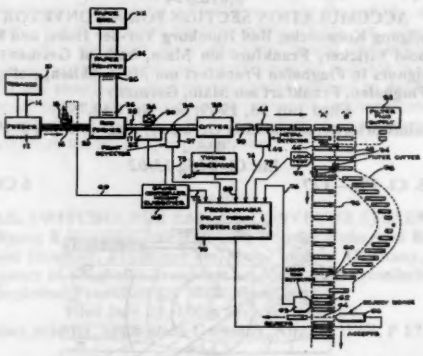


opposed frame members and maintain the frame members in place on the ends of the bundle. The frame members include unique integral receptacles for skids for the stacked mat sections.

3,616,900
METHOD FOR BLEACHING GRAY KAOLIN CLAY
Tom A. Cecil, Highland Park, N.J., and Daniel A. Jacobs, Macon, Ga., assignors to Engelhard Minerals & Chemicals Corporation, Woodbridge, N.J.
Continuation-in-part of application Ser. No. 690,423, Dec. 14, 1967, now abandoned. This application July 9, 1969, Ser. No. 840,505
Int. Cl. B03b *7/00;* C09c *1/42*
U.S. Cl. 209—1 10 Claims

Sedimentary gray kaolin clay containing relatively large amounts of iron and organic impurities is bleached by dispersing finely divided bubbles of ozone gas into a fluid, aqueous slip of the clay. The slip is acidified, flocculated, filtered and washed.

3,616,901
ARTICLE-CLASSIFYING SYSTEM AND METHOD
Charles Richard Groves, Worthington, Ohio, assignor to Industrial Nucleonics Corporation
Filed Mar. 23, 1970, Ser. No. 21,929
Int. Cl. B07c *5/02*
U.S. Cl. 209—74 21 Claims



Articles, such as cigarettes, are moved successively down a prescribed path past sensing and operating stations. Each article is categorized and the category, such as reject, is recorded in a respective memory cell of an addressable

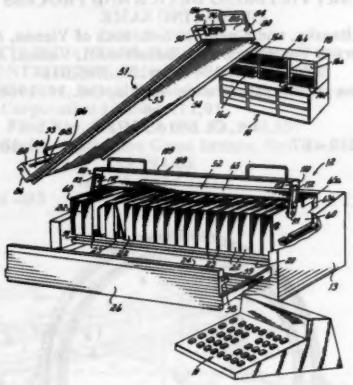
memory according to a memory-addressing signal formed as the difference between a counter signal and the address signal of the respective sensing station. When the article reaches the operating station, the recorded signal is read out from the respective memory cell by addressing it with a memory address signal formed as the difference between the counter signal and the address signal of the operating station. The readout signal is utilized to operate upon the article, as to reject a faulty cigarette from the path.

3,616,902

CARD STORAGE TRANSFER AND POSITIONING DEVICE FOR USE IN CONJUNCTION WITH CARD RETRIEVAL APPARATUS

Robert D. Parry, deceased, late of Cincinnati, Ohio (by Margaret G. Parry, executrix), assignor to O.K. Partnership, Cincinnati, Ohio

Filed May 16, 1969, Ser. No. 826,090
Int. Cl. B07c *1/20*
U.S. Cl. 209—80.5 **12 Claims**



An accessory device for increasing the effective card storage capacity of retrieval systems in which edge-notched coded cards are randomly stored in face-to-face upstanding relation on a platen in a card selector apparatus. The accessory device includes a two-piece card tray having a substantially planar bottom panel against which the code-notched edges of the cards rest when stored face-to-face in a vertical disposition, and a retaining structure at least partially surrounding the upstanding cards. The retaining structure is positionable between engaged and disengaged positions relative to the bottom panel, thereby facilitating transfer of the cards between the tray and the selector. The retaining structure, when engaged with the bottom panel, cooperates therewith to store the cards in the tray. Alternatively, and when the retaining structure is in the course of being positioned between its engaged and disengaged positions relative to the panel, the retaining structure functions to transfer the cards between a position of support on the bottom panel and a position of support in the card selector.

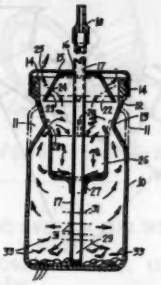
3,616,903

BIRD SEED CLEANING DEVICE

Edward L. Cicero, 52-62 66th St., Maspeth, N.Y.

Filed May 12, 1969, Ser. No. 823,691
Int. Cl. B07b *7/00*
U.S. Cl. 209—139 R **10 Claims**

A portable apparatus for removing the expended husks from bird seed mixtures after the bird has shelled the seeds and left the husks among the seeds includes a receptacle, a perforate detachable cover having a perforate deflector extending downwardly into the receptacle, air supply means extending through the cover into the receptacle and a husk receiving chamber in the receptacle. The airstream agitates the mixture in the receptacle and floats the husks upwardly



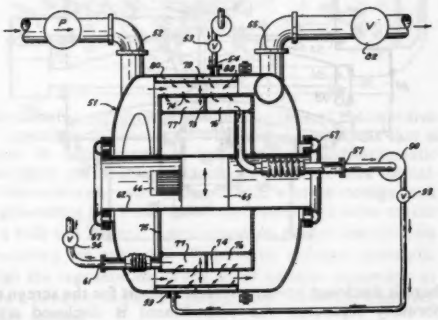
for collection in the husk receiver while the air exhausts through the cover.

3,616,904

APPARATUS FOR TREATING DISCRETE MATERIALS

Toivo Ensio Aremaa, Karhula, Finland, assignor to A. Ahlstrom Osakeyhtio, Noormarkku, Finland

Continuation-in-part of application Ser. No. 360,891, Apr. 20, 1964, now abandoned. This application June 11, 1968, Ser. No. 753,797
Int. Cl. B07b *1/28*
U.S. Cl. 209—269 **2 Claims**



Apparatus for treating particulate material. Particles fed into a closed vessel are screened through a filter vibrating at a high frequency in a plane deviating substantially from the plane of the filter surface. Since the system is closed, a controlled overpressure can be maintained on the input side of the filter to drive particles through the filter. Different outlets are provided for material which passes through the filter and material which does not.

3,616,905

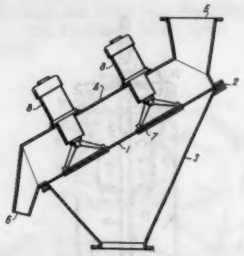
ARRANGEMENT FOR CLASSIFYING OF LIQUID SUSPENSIONS AND OF SOLID MATERIALS

Ladislav Kristek; Antonin Svizela, and Ivo Hampl, all of Prerov, Czechoslovakia, assignors to Prerovske strojirny, narodni podnik, Prerov, Czechoslovakia

Filed Feb. 26, 1969, Ser. No. 802,567
Claims priority, application Czechoslovakia, Feb. 26, 1968, 1445/68
Int. Cl. B07b *1/28*
U.S. Cl. 209—310 **5 Claims**

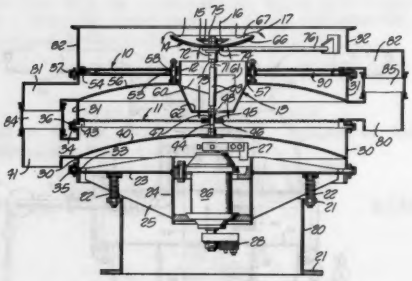
Liquid suspensions and solid material are classified by means of a vibrating screen, to which vibrations are transmitted by at least one vibration exciter, engaging and encom-

passing the screen within a part of its surface area. Damping of oscillations due to the treated material resting on the



screen is thus substantially reduced, resulting in an increased efficiency in classification.

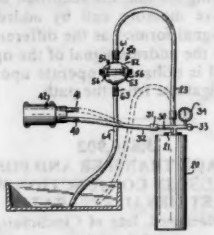
3,616,906
SCREEN SUPPORT
John P. Miller, Garden Grove, and Malcolm D. Maxsted, Torrance, both of Calif., assignors to Sweco, Inc., Los Angeles, Calif.
Filed July 11, 1969, Ser. No. 840,914
Int. Cl. B07b *1/36*
U.S. Cl. 209—403 **8 Claims**



There is disclosed herein a screen support for the screen of a vibratory separator. An embodiment is disclosed with respect to a typical screen used in vibratory separators and including an outer tension ring, an inner tension ring and screen cloth of a desired mesh stretched between these tension rings. The present screen support includes a plurality of radially disposed member, or radiating spokes, coupled between the inner and outer tension rings. These members may be made adjustable, and the ends thereof preferably are essentially hingeably mounted with respect to the tension rings rather than being rigidly coupled thereto. The screen support is particularly useful for fine mesh screens which normally are prone to breakage because of large unsupported areas thereof. Additionally, the support eliminates secondary vibrations in the screen.

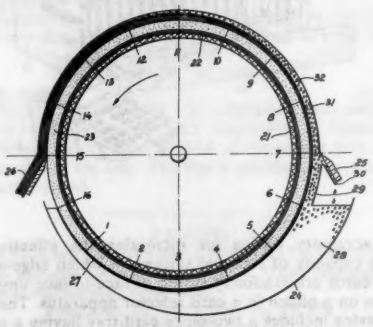
3,616,907
DEEP FRY OIL-FILTERING UNIT, METHOD AND APPARATUS
Robert D. Van Vleet, 931 Willsie, Rapid City, S. Dak.
Filed Mar. 9, 1970, Ser. No. 17,469
Int. Cl. B01d *37/00*
U.S. Cl. 210—65 **6 Claims**

A holding tank having one end of a length of flexible tubing connected to a hot oil port with the other end connected to the inlet of a filter housing or positionable in communication with the hot oil in a deep frying unit, and an air pump having an air inlet and an air outlet with a length of flexible conduit connected between one of said inlet and said outlet and an airport in the holding tank. The entire filtering unit



further being mounted in a wheeled housing for storage and easy access to any deep fryer.

3,616,908
ROTARY FILTERING DEVICE AND PROCESS OF OPERATING SAME
Karl Rokitansky, and Guenther Solt, both of Vienna, Austria, assignors to Vogelbusch Gesellschaft mbH, Vienna, Austria
Filed Oct. 9, 1969, Ser. No. 865,016
Claims priority, application Austria, Oct. 16, 1968, A 10,119/68
Int. Cl. B01d *25/38*
U.S. Cl. 210—67 **16 Claims**

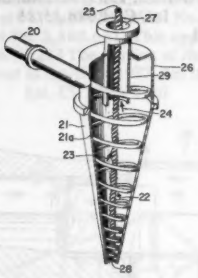


A rotary drum filter having a filter aid layer on its filter surface is provided with an adjustable scraper at the line of discharge of the filter cake and with an adjustable stripper adjacent the line of wet filter cake formation as the filter cake emerges from the slurry tank. The scraper is automatically advanced toward the drum to progressively remove the filter cake with portions of the filter aid layer as the drum rotates and the stripper also is either manually or automatically advanced toward the drum to maintain a substantially constant thickness of filter cake on the layer of filter aid as the thickness of that layer progressively decreases.

3,616,909
CONTINUOUS HIGH TEMPERATURE PROCESS FOR RECLAIMING REUSABLE FRYING FATS
Erlend R. Lowrey, Greenhills, and Robert O. Schmitt, Wyoming, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio
Filed Nov. 14, 1969, Ser. No. 876,644
Int. Cl. B01d *21/26*
U.S. Cl. 210—73 **15 Claims**

A continuous process for reclaiming reusable frying fat, which prior to reclamation, is contaminated with solid particles of food material, said process comprising, tangentially introducing a flow of contaminated frying fat into a cylin-

droconical shaped separating zone wherein said fat is subjected to vortical forces and separated into an outer-contaminated portion and an inner contamination-free portion which is reclaimed and reused.

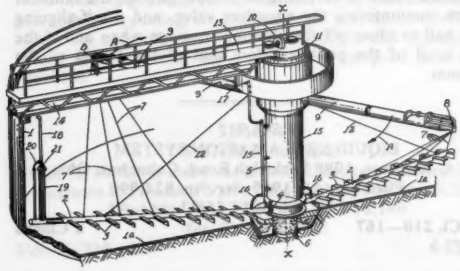


3,616,910

SETTLING APPARATUS AND METHOD OF CONTROLLING THE OUTPUT THEREOF

Michael R. Gericke, Berea, Republic of South Africa, assignor to Union Corporation Limited

Filed Nov. 20, 1969, Ser. No. 878,557
Claims priority, application Great Britain, Nov. 26, 1968, 55,991/68
Int. Cl. B01d *21/18*
U.S. Cl. 210—83 4 Claims



A method of controlling the output of settling apparatus of the type comprising a settling tank; and raking gear which is operable in the settling tank and whose vertical operating position in the tank is variable, which is characterized by the step of adjusting the buoyancy of at least part of the raking gear submerged in fluid in the settling tank, such as by varying the amount and/or kind of a flowable medium in a hollow and fluidtight tubular raking blade carrier arm.

Also settling apparatus of the type specified which is characterized by means for introducing fluid into and withdrawing fluid from a hollow, fluidtight chamber presented by the raking gear.

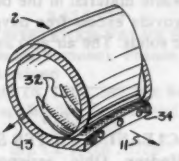
3,616,911

A PROCESS FOR REMOVING SOLID PARTICLES FROM A LIQUID

Sergio E. Rodriguez, Woodland Hills, and Walter Unterberg, Sherman Oaks, both of Calif., assignors to North American Rockwell Corporation

Continuation-in-part of application Ser. No. 750,797, Aug. 7, 1968, now abandoned. This application Jan. 19, 1970, Ser. No. 4,019
Int. Cl. B01d *21/00*
U.S. Cl. 210—84 4 Claims

A separating process for removing said particles dispersed in a liquid by moving said liquid through a curved conduit wherein said conduit has lateral outflow ports for effectively removing the dispersed particles from the liquid.

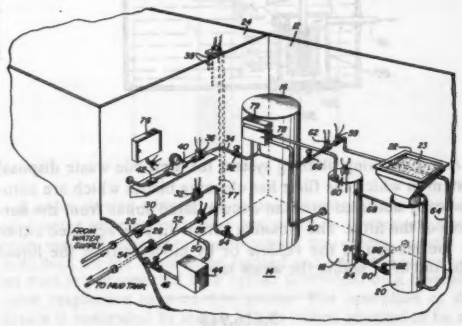


3,616,912

WATER-SOFTENING SYSTEM FOR WELL-DRILLING UNITS

Dexter E. Bruton, Oklahoma City, Okla., assignor to Southwest Factories, Inc.

Filed Jan. 31, 1969, Ser. No. 795,433
Int. Cl. B01d *29/38*
U.S. Cl. 210—89 3 Claims



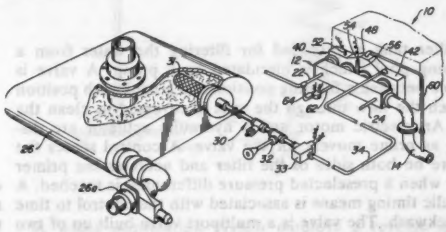
A system for supplying a continuous flow of calcium-free water especially for use in oil-well-drilling operations that is portable in nature and is self-contained for automatic regeneration and structurally includes a storage tank for calcium-free water, a water softener unit, a brine storage tank for regenerating the water-softening materials, a brine maker tank, a bulk salt hopper, a piping system, pumps and controls for rendering the operation of the water softener automatic and also the regeneration of the water softener automatic to provide a continuous flow of calcium-free water for whatever purposes desired.

3,616,913

APPARATUS AND METHOD FOR WASTE DISPOSAL

James Sims Reid, Hudson, Ohio, assignor to The Standard Products Company, Cleveland, Ohio

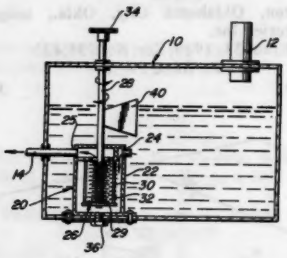
Continuation-in-part of application Ser. No. 781,141, Dec. 4, 1968. This application June 17, 1970, Ser. No. 47,020
Int. Cl. B01d *21/24*
U.S. Cl. 210—104 7 Claims



An improved waste disposal apparatus and method in which a boiler unit is positioned between the block of an en-

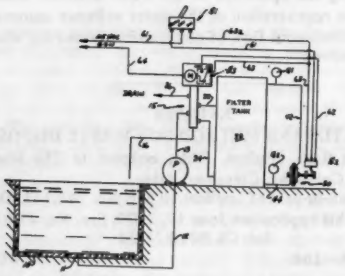
gine and the exhaust manifold, with passages in the boiler unit through which the hot gases pass, thereby heating and vaporizing liquid waste material in the boiler. Air is supplied to the boiler to provide excess free oxygen for burning and consuming organic solids. The air also sweeps the boiler free of ash.

3,616,914
SELF-CLEANING FILTER SYSTEM
James S. Reid, Hudson, Ohio, assignor to The Standard Products Company, Cleveland, Ohio
Filed Aug. 12, 1969, Ser. No. 849,356
Int. Cl. B01d *29/38*
U.S. Cl. 210—107 **12 Claims**



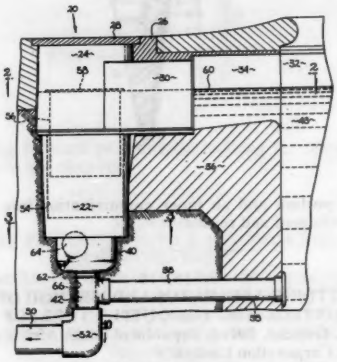
A self-cleaning filtering system for a mobile waste disposal system in which the filter has cleaning blades which are automatically actuated to clean accumulated solids from the surfaces of the filter. The cleaning action may be actuated either by the motion of the vehicle or by movement of the liquid into, out of or within the waste tank.

3,616,915
AUTOMATIC FILTER CONTROL
Robert A. Whitlock, Rockford, Ill., assignor to Aquamatic Inc., Rockford, Ill.
Filed May 15, 1969, Ser. No. 824,873
Int. Cl. B01d *29/38*
U.S. Cl. 210—108 **6 Claims**



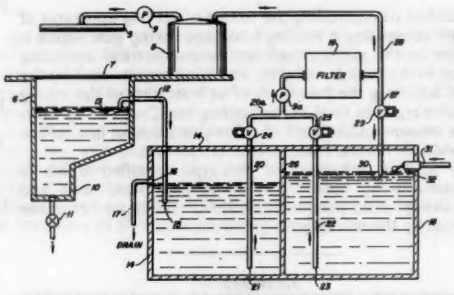
A filter tank is provided for filtering the water from a swimming pool which is circulated by a pump. A valve is movable between a filtering position and a backwash position in which the flow through the tank is reversed to clean the filter. An electric motor and a hydraulic actuator are disclosed as prime movers for the valve. A control senses the pressure on both sides of the filter and actuates the primer mover when a preselected pressure differential is reached. A hydraulic timing means is associated with the control to time the backwash. The valve is a multiport valve built up of two pair of individually molded plastic members. Each member is arranged to interfit with an adjacent member and provide a valve seat at the juncture.

3,616,916
ANTIAIRLOCK EQUALIZER DEVICE
Nat Greene, Los Angeles, Calif., assignor to American Concrete Products Co., Los Angeles, Calif.
Filed Oct. 13, 1969, Ser. No. 865,571
Int. Cl. B01d *35/28*
U.S. Cl. 210—121 **7 Claims**



An automatic skimmer system for a swimming pool comprising an antiairlock equalizer valve capable of preventing airlock of a fluid pump, and of varying fluid flow from the recirculating pool drain, a trimmer valve formed of several adjustable vanes to vary volume of flow through the skimmer before encountering the equalizer valve, and a self-aligning float ball to close off the skimmer passage when and if the fluid level of the pool is below that of the throat of the skimmer.

3,616,917
LIQUID RECLAMATION SYSTEM
John A. Hellwege, 1088 Parkleigh Road, Columbus, Ohio
Filed May 15, 1969, Ser. No. 824,990
Int. Cl. B01d *35/02*
U.S. Cl. 210—167 **2 Claims**



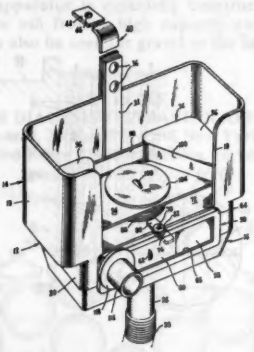
A system for the reclamation of liquid used in various cleaning operations which comprises a plurality of settling and decanting tanks and a filter so arranged as to cause removal of contaminating solids by precipitation, or sedimentation and by filtration, and removal of relatively lighter weight solid and liquid contaminants of overflow decantation.

3,616,918

WALL-SUPPORTED SKIMMER FOR SWIMMING POOLS AND THE LIKE

Joseph Diemond, Simsbury; Melvin Y. Gershman, West Hartford, and Fred A. Ravreby, Framingham, all of Mass., assignors to Coleco Industries, Inc., Hartford, Conn.

Continuation-in-part of application Ser. No. 797,396, Feb. 7, 1969, now Patent No. 3,508,661. This application Apr. 30, 1970, Ser. No. 33,213 The portion of the term of the patent subsequent to April 28, 1987, has been disclaimed
Int. Cl. E04h *3/20*
U.S. Cl. 210—169 10 Claims



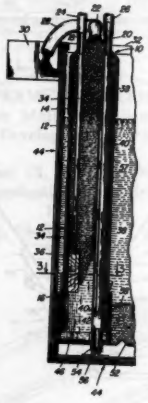
The housing of a skimmer for mounting on the sidewall of a swimming pool has a flow passage thereinto and a discharge flow outlet therefrom. A float member rises and falls with the water level and provides a conduit into the lower portion of the housing so that matter may be skimmed from near the surface and carried into the housing. A passageway bypassing the float member may be controlled to adjust the rate of waterflow therethrough, and appropriate means for supporting the skimmer on the pool sidewall is provided.

3,616,919

WATER PURIFIER

Henry A. Feddern, and John A. Sabol, both of Yonkers, N.Y., assignors to Precision Valve Corporation, Yonkers, N.Y.

Filed Mar. 26, 1969, Ser. No. 818,180
Int. Cl. E04h *3/20*
U.S. Cl. 210—169 6 Claims



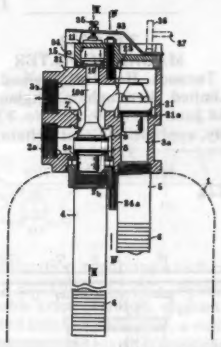
A device for treatment of aquarium water provides for water circulation and aeration and provides for removal of organic matter by capturing particles of organic matter on the surface of rising air bubbles. The bubbles form a foam which is discarded.

3,616,920

WATER SOFTENER VALVE DEVICE

Jean Cambot, Palaiseau(Essonne), France, assignor to Sapir S.A., Bienne, Switzerland

Filed July 16, 1969, Ser. No. 842,222
Claims priority, application Switzerland, July 26, 1968, 11263/68
Int. Cl. B01d *23/26*
U.S. Cl. 210—190 6 Claims



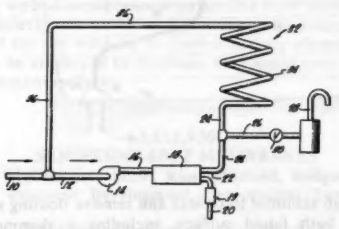
A valve device adapted to be associated with the reservoir of a water softener operating according to the ion exchange resin method, this device, comprising two ducts, namely an inlet duct for the water to be treated and a treated-water outlet duct interconnected by a bypass controlled by a reversing valve responsive to a control piston. The operation of this device is controlled by means of two valves adapted to be actuated by any suitable mechanism for simultaneously moving said valves either to their closed position or to their open position, said valves being inserted in two branch lines extending from said inlet duct respectively upstream and downstream of said reversing valve, and leading the first one to the chamber containing the piston controlling said reversing valve, and the other one to a drain duct. A third branch line is provided between said outlet duct and an orifice opening into said reservoir for delivering rinsing water thereto, and a product for regenerating the treatment resins when both control valves are in their closed position, whereby the direction of flow in said reservoir is reversed.

3,616,921

WATER PURIFICATION AND STORAGE APPARATUS

Donald T. Bray, 732 Elder Pl., Escondido, Calif.

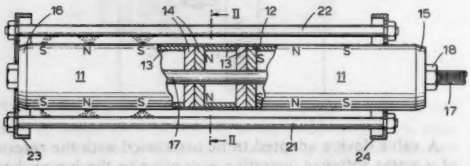
Filed Oct. 8, 1969, Ser. No. 864,764
Int. Cl. B01d *31/00*
U.S. Cl. 210—195 8 Claims



A water purification system employs a reverse osmosis water purification unit whose purified water output is temporarily stored by introduction into one end of an elongated

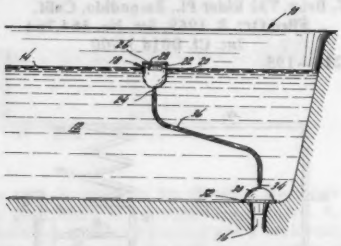
conduit, for example a long pipe. The other end of the elongated conduit is connected to a line supplying impure feed water under pressure to a pump which raises the feed water pressure for introduction into the reverse osmosis unit. The purified water stored in the elongated conduit is maintained under pressure by reason of its connection to the pressurized feed water supply line, and is available for use from a connection made to that end connected to the purification unit output. Mixing or intermingling of the feed water and purified water is restricted essentially to that resulting from diffusion, and is therefore small. Alternative conduits which can serve for product water storage container include a series of interconnected elongated tanks or pipes, a tank containing a separator to divide its interior into a number of flow channels and a tank containing packing, for example, raschig rings, broken tile, or inert powder or granules.

3,616,922
MAGNETIC FILTER
Arthur George Turnock, Hockley, England, assignor to Electromagnets Limited, Birmingham, England
Filed June 11, 1969, Ser. No. 832,245
Claims priority, application Great Britain, June 29, 1968, 31192/68
Int. Cl. B01d *35/06*
U.S. Cl. 210—222 **5 Claims**



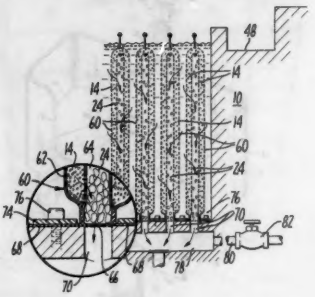
The invention provides a magnetic filter for removing magnetic particles from a fluid flowing past the filter. Regions of locally intensified magnetic field are formed by an elongated magnet member having a series of alternate North and South poles and at least one elongated intensification member of ferromagnetic material placed a short distance from the magnet member. The magnet member itself is removable from a support in such a way that collected magnetic particles remain on the unmagnetized support, to facilitate cleaning of the filter.

3,616,923
BATHTUB SKIMMER
Ernest K. Haley, 134 Northwestern Parkway, Louisville, Ky.
Filed June 25, 1970, Ser. No. 49,805
Int. Cl. C02b *9/02*
U.S. Cl. 210—242 **7 Claims**



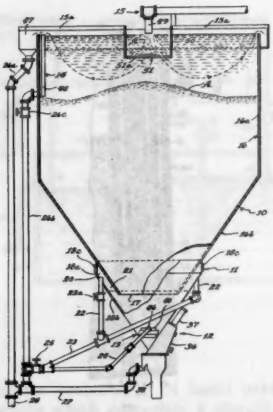
A bathtub skimmer to collect and remove floating material from the bath liquid surface, including a skimmer float balanced to ride in the liquid and having surface skimming openings partially submerged in the liquid and open to an interior float collecting chamber, a bathtub drain connection cup, and a flexible tube interconnecting the float and connection cup, operable to discharge collected material into the drain.

3,616,924
FILTER APPARATUS
Kenneth L. Sanborn, Walnut Creek, Calif., assignor to B. D. Bohna & Co., San Francisco, Calif.
Continuation of application Ser. No. 721,240, Apr. 15, 1968, now abandoned. This application July 30, 1970, Ser. No. 64,115
Int. Cl. B01d *23/12, 23/16*
U.S. Cl. 210—284 **2 Claims**



The filter employs a mass of finely divided particulate matter, such as sand, as the filtering medium. Longitudinally extending channels are formed in the filter bed so as to divide it into a plurality of relatively narrow segments and the liquid to be filtered enters into the filtering segments from the channels. In a modified form of the invention drainage channels are also provided intermediate the feed channels so that the liquid to be filtered passes from the feed channels, through filter segments of substantially uniform thickness and then out the drainage channels.

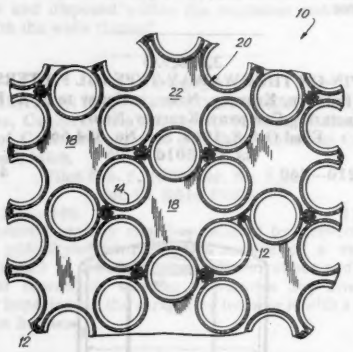
3,616,925
APPARATUS FOR DEWATERING GRANULAR MATERIAL
Edgar B. Tolman, Winnetka, Ill., assignor to United Conveyor Corporation
Filed Mar. 19, 1969, Ser. No. 808,427
Int. Cl. B01d *21/02*
U.S. Cl. 210—311 **16 Claims**



Apparatus for separating granular material from water in which it has been carried, as in a hydraulic conveyor or the like, said apparatus including a hopper to receive material

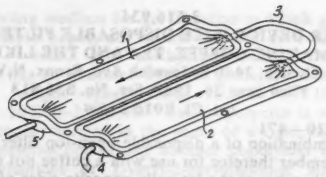
laden water, said hopper having an open bottom of substantial area, dewatering means surrounding the lower end portion of the hopper which is so constructed that the hydrostatic pressure of water in the hopper causes water to flow around the bottom edge of the hopper, through material arresting screens, and through overflow water outlets in the dewatering means, and granular material discharge means below the hopper and the dewatering means for removing dewatered material from the hopper through an outlet opening. Auxiliary external dewatering units are located adjacent the outlet opening, and in the top of the hopper is means for discharging water from above the level of material in the hopper. The apparatus is especially constructed to handle bottom furnace ash from a high capacity coal fired steam boiler, but may also be used for gravel or the like.

3,616,926
TUBULAR DIALYSIS FILTRATION APPARATUS
Eric S. Lichtenstein, 24 East 93rd St., New York, N.Y.
Filed Feb. 12, 1970, Ser. No. 10,967
Int. Cl. B01d *31/00, 13/00*
U.S. Cl. 210—321 **12 Claims**



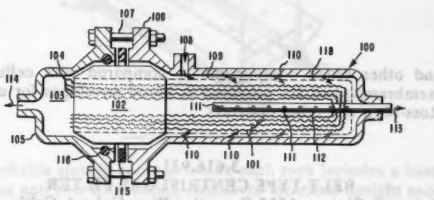
A dialysis apparatus to be used for a device such as an artificial kidney. The apparatus is primarily formed by a single semipermeable membrane supported, as by wires, in such a way that it has a configuration defining two groups of tubes which can only communicate with each other through the membrane itself. Thus, the single membrane is supported by the wires and suitable tubular extensions to define two groups of tubes separated from each other only by the membrane itself so that the fluids to be treated can be subjected to diffusion, or osmosis through the membrane from one of the groups of tubes to the other of the groups of tubes while permitting collection of separated components to take place.

3,616,927
SEMIPERMEABLE MEMBRANES
William McClements Muir, Rhu, Scotland, assignor to National Research Development Corporation, London, England
Filed Mar. 18, 1969, Ser. No. 808,236
Claims priority, application Great Britain, Mar. 20, 1968, 13,491/68
Int. Cl. B01d *39/16, 31/00*
U.S. Cl. 210—321 **6 Claims**



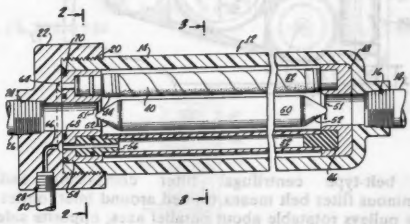
Membranes for extracorporeal haemodialysis are prepared from copolymers of n-butyl methacrylate (55 to 75 percent) and acrylic acid (45 to 25 percent) prepared by portionwise addition of reactants to a reactor. These have superior transfer properties for urea, creatinine, uric acid and other blood components as compared with cellulosic membranes, and are prepared as blood envelopes for use in Ross-Muir and other dialyzers.

3,616,928
PERMEATION SEPARATION DEVICE FOR SEPARATING FLUIDS
Naftali Walter Rosenblatt, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.
Filed Oct. 2, 1969, Ser. No. 863,216
Int. Cl. B01d *13/00*
U.S. Cl. 210—321 **3 Claims**



A permeation separation apparatus which comprises an enclosure containing therein a plurality of long, thin, hollow, selectively permeable crimped fibers, an inlet for introducing fluid to be separated into the enclosure, a collection chamber for removing fluid components that pass through the fiber walls into the hollow bores of the fibers, and an outlet on the enclosure for removing the rejected fluid.

3,616,929
REVERSE OSMOSIS MODULE
Serop Manjikian, Del Mar, Calif., assignor to Universal Water Corporation, Del Mar, Calif.
Continuation-in-part of application Ser. No. 818,514, Apr. 23, 1969. This application May 20, 1970, Ser. No. 39,104
Int. Cl. B01d *31/00*
U.S. Cl. 210—321 **12 Claims**

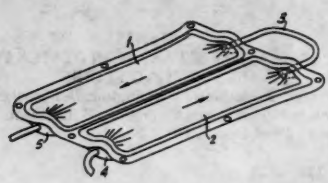


A module, useful in systems for treatment of liquids by reverse osmosis, comprises a pressure-resistant container in which are supported one or more membrane elements having helically wound membrane strips around their outer surfaces. A feed inlet, brine outlet and product water connection are provided for the module. A central dummy element or baffles may be employed to distribute feed liquid over the membrane element surfaces.

3,616,930
SEMIPERMEABLE MEMBRANES
William McClements Muir, Rhu, Scotland, assignor to National Research Development Corporation, London, England
Filed Mar. 18, 1969, Ser. No. 808,237
Claims priority, application Great Britain, Mar. 20, 1968, 13492/68
Int. Cl. B01d *31/00, 13/00*
U.S. Cl. 210—321 **12 Claims**

Membranes for extracorporeal haemodialysis are prepared from copolymers of acrylonitrile (80–90 percent) and dimethylaminoethyl methacrylate (20–10 percent) prepared

by portionwise addition of reactants to a reactor. These have superior transfer properties for urea, creatinine, uric acid, and other blood components as compared with cellulosic membranes, and are prepared as blood envelopes for use in Ross-Muir and other dialyzers.

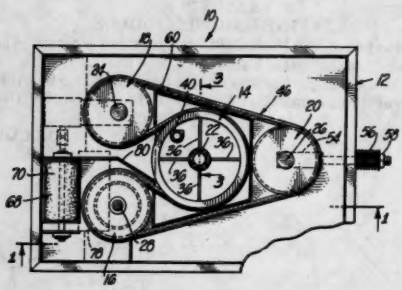


3,616,931

BELT-TYPE CENTRIFUGAL FILTER

Robert J. Zievers, 1535 Carnation Way, Upland, Calif.

Filed Mar. 19, 1970, Ser. No. 21,093
Int. Cl. B01d 33/04
U.S. Cl. 210—370 6 Claims



A belt-type centrifugal filter comprising endless, foraminous filter belt means trained around inlet, outlet and guide pulleys rotatable about parallel axes, opposite sides of the belt means respectively engaging the inlet and outlet pulleys. The inlet pulley is hollow and is provided with a foraminous periphery, and the material to be filtered is delivered to the interior of the inlet pulley. The solids collect on the side of the belt means which is in engagement with the inlet pulley, and are centrifugally ejected from the belt means as it negotiates the outlet pulley. A conveyor receives the centrifugally ejected solids from the outlet pulley, and a scraper removes the solids from this conveyor.

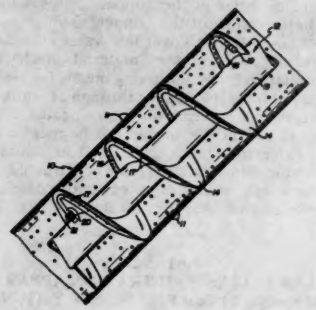
3,616,932

ROTARY SCREEN WASHER

Gilbert L. Bancroft, West Vancouver, British Columbia, Canada, assignor to S. W. Hooper & Co. Ltd., North Vancouver, British Columbia, Canada

Filed May 27, 1969, Ser. No. 828,285
Int. Cl. B01d 35/28
U.S. Cl. 210—405 10 Claims

Equipment for separating liquids and solids and particularly for separating pulp stock and "water" in the paper industry of the kind having a perforate, inclined cylindrical basket and a screw conveyor moving the materials to be separated along the drum, in which there are sprays directed at the drainage surface of the drum and carried by and rotatable with the screw-type conveyor to keep that drainage surface free.

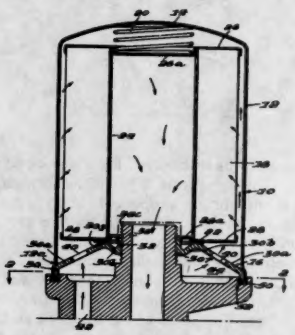


3,616,933

SPIN-ON THROWAWAY-TYPE OIL FILTERS

Jesse A. Baldwin, Kearney, Nebr., assignor to J. A. Baldwin Manufacturing Company, Kearney, Nebr.

Filed Oct. 8, 1969, Ser. No. 864,661
Int. Cl. B01d 27/08
U.S. Cl. 210—440 4 Claims



A spin-on throwaway-type liquid (oil) filter using a one-piece, heavy-gauge baseplate whose sectional configuration is such as to provide a reversely coned, inwardly directed, annular formation intermediate its outer periphery and its central portion, and said central portion having the form of an inturned neck, said reversely coned annular formation defining an axially inward, circular line-form seat for the annular filter element of said filter, said centrally inturned neck comprising a cylindrical extension which projects axially inward and is formed integral with the smaller diameter circular line of said annular formation, and the bore of said neck being threaded for the reception of an engine-block nipple.

3,616,934

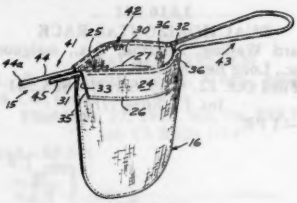
FILTER DEVICE WITH DISPOSABLE FILTER FOR MAKING COFFEE, TEA AND THE LIKE

Joseph C. Ehrlich, 2440 Sedgewick Ave, Bronx, N.Y.

Filed June 26, 1969, Ser. No. 836,813
Int. Cl. B01d 23/04
U.S. Cl. 210—471 16 Claims

The combination of a disposable open-top filter bag and a holder member therefor for use with a coffee pot or the like. The filter bag has at the laterally opposite sides of the upper mouth portion thereof two transversely extending open-ended channels, the holder member having two arms extend-

ing through and slidably engageable with the respective channels, the arms having intermediate portions thereof bent laterally in opposite directions and adapted to spread open the mouth portion of the filter bag when the arms are inserted and slidably moved through the channels. The holder member is formed of a single smooth wire, and has forward



and rear portions protruding from the front and rear portions of the bag, the protruding portions being adapted to rest upon the rim (in one embodiment of this invention) of the container with the filter bag freely suspended from the holder member and disposed within the container out of engagement with the walls thereof.

3,616,935

PREPARATION OF ANTITHROMBOGENIC SURFACES

Jim Love, Concord, and George W. Holmes, Walnut Creek, both of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Filed Feb. 5, 1970, Ser. No. 9,069
Int. Cl. B01d *39/00*
U.S. Cl. 210—500 **11 Claims**

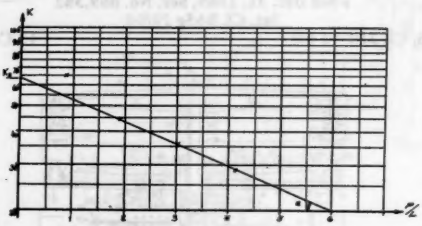
Antithrombogenicity may be obtained by irreversibly adsorbing polyalkylenimine on the surface of a variety of materials such as cellulose, glass, silicon rubber and the like and after thoroughly washing to remove any unadsorbed polymer heparinizing the surface by treating it with a solution of sodium heparin.

3,616,936

SEPARATION MEDIUM FOR GEL FILTRATION AND A METHOD FOR ITS PREPARATION

Ingemar Haldor Johansson, and Marius Klaus Joustra, Uppsala, both of Sweden, assignors to Pharmacia Fine Chemicals AB, Uppsalla, Sweden

Filed Oct. 27, 1969, Ser. No. 869,811
Claims priority, application Sweden, Oct. 30, 1968, 14,667/68
Int. Cl. B01d *39/04*
U.S. Cl. 210—504 **4 Claims**



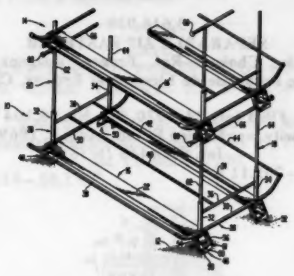
A separating medium for gel filtration in which grains of a water-insoluble copolymer of acrylamides or 1-vinyl-2-pyrrolidinone with N,N'-methylene-bis-acrylamide. The copolymer has an exclusion limit for globular proteins in the molecular weight range from 10,000 to 10,000,000 preferably 50,000–2,000,000. Said copolymer is reinforced by being copolymerized in the pores of a rigid, hydrophilic granular material comprising another copolymer of one or more acrylamides or 1-vinyl-2-pyrrolidinone with N,N'-methylene-bis-acrylamide wherein the bis-acrylamide content is 30 to 90 percent of the total weight of the two substances.

3,616,937

STACKABLE STORAGE RACKS

William L. Frame, Route 2, Box 412, Texarkana, Tex., and Robert D. Renfrow, Lockesburg, Ark.

Filed Oct. 27, 1969, Ser. No. 869,669
Int. Cl. A47f *7/04*
U.S. Cl. 211—24 **10 Claims**



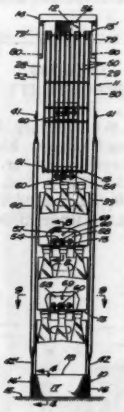
Stackable storage racks in which each rack includes a base section and two detachable, cantilever-mounted upright sections. When disassembled from the upright sections, the base sections can be stacked upon one another for compact shipping. The upright sections are assembled with the base section by telescopically inserting columns of the upright sections into support tubes of the base section. The racks are stacked upon one another and interact to form a stable, tiered structure. When the racks are stacked, the base section of each rack provides a stiffening action between the upright sections of the subjacent rack.

3,616,938

CENTER CHANNEL ADJUSTABLE DISPLAY AND VENDING RACK

Kenneth McAleenan, Larchmont; John B. Pendergrast, Jr., New York; Howard W. LaMorte, New York, N.Y.; Stanley Pitt, Closter, N.J., and William D. Woods, Garden Grove, Calif., assignors to Vita-Pakt Citrus Products Co., Covina, Calif.

Filed Sept. 16, 1969, Ser. No. 858,449
Int. Cl. A47f *5/10*
U.S. Cl. 211—150 **17 Claims**



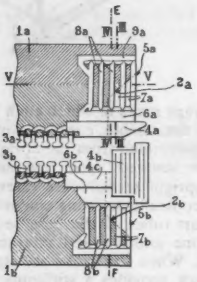
A display rack for individual articles of merchandise consisting of a vertical rear support which rests on a supporting surface and which has a single central channel of dovetail shape. A series of trays are carried in the channel and are pivotally mounted on releasable fastening clamps for secur-

ing each tray in a selected vertically adjusted position in the channel. A spring acting between the tray and the clamp tilts the tray upward against the support after it has been emptied of merchandise. The support may be fastened to a base which extends forwardly beneath the trays, or may be fastened to a vertical wall, and an advertising panel is releasably mounted either at the top of the support or on a shelf at the top of the support.

3,616,939
SEPARABLE ZIP FASTENER

Marcel Potin, Choisy-le-Roi, France, assignor to Societe Financiere Francaise de Licences et Brevets, Choisy-le-Roi, France

Filed July 24, 1970, Ser. No. 58,104
Claims priority, application France, Aug. 6, 1969, 6,926,959
Int. Cl. A44b *19/38*
U.S. Cl. 24—205.11 F **1 Claim**

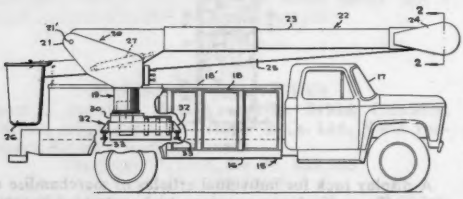


A zip fastener of the separable type wherein two rows of connecting members comprise at one of their ends a separable junction device consisting of two members, that is, a male member and a substantially box-shaped female member, formed by molding plastic material directly on the ends of said two ends. Before molding said members there is cut in each carrier tape of the zip fastener a notch which extends from the inner edge of said tape to at least the middle line thereof, whereafter during the making of the members of said junction device, there is formed in each plate solid therewith on the one hand a flat face of relatively great thickness which is adjacent to the corresponding junction member, and on the other hand, on the opposite side, area having a series of transverse grooves formed therein which extends over said tape proper.

3,616,940
BOOM STRUCTURE FOR UTILITY TRUCKS AND THE LIKE

Edwin Earl Milner, Jr., Williamsburg, Va., assignor to Baker Equipment Engineering Company, Richmond, Va.

Continuation-in-part of application Ser. No. 757,075, Sept. 3, 1968, now Patent No. 3,533,515. This application Mar. 30, 1970, Ser. No. 23,834
Int. Cl. B66c *23/06*
U.S. Cl. 212—59 **16 Claims**

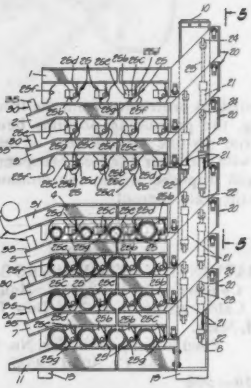


An articulated boom structure including a lower boom section and an upper boom section pivoted together at a pivot shaft extending along a horizontal axis through both sections. The shaft is keyed to one of the sections and rotatable in the other, and a pair of crank members coupled to the shaft and hydraulic cylinder units coupled to the crank members and to the other boom section drive the sections to different relative angular positions about the shaft axis.

3,616,941
DUAL HORIZONTAL RACK

James Bernard Walling, Houston, Tex., assignor to Byron Jackson Inc., Long Beach, Calif.

Filed Oct. 22, 1969, Ser. No. 868,541
Int. Cl. B65g *1/10*
U.S. Cl. 214—1 PB **9 Claims**

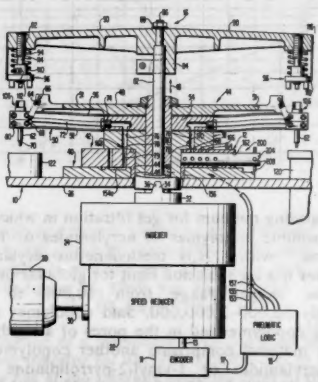


A horizontal rack for the racking of stands of well pipe wherein a plurality of pairs of horizontally extended and laterally spaced rack beams are provided for supporting layers of pipe; and included in each pair of beams is a pipe loading beam and a pipe unloading beam, the pipe loading beam having a finger pivotally connected thereto for movement between an out-of-the-way position and a projected position adapted to receive a pipe and guide the same onto the beam, and the pipe unloading beam including a finger normally disposed in an out-of-the-way position and automatically movable to a pipe supporting position as a stand of pipe is moved from the beam.

3,616,942
SELECTIVE CHIP PICKUP APPARATUS FOR MULTIPLE FEED BOWLS

Lothar W. Gruber, Yorktown Heights, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 31, 1969, Ser. No. 889,382
Int. Cl. B65g *29/00*
U.S. Cl. 214—1 BH **13 Claims**



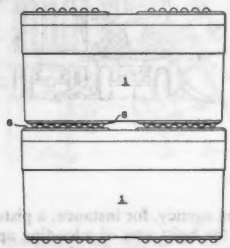
A mechanical and pneumatic chip pickup apparatus employs a controllable vacuum manifold for selectively feeding

vacuum or positive fluid pressure to vacuum pencils carried by an indexed, rotatable eight-position flexing pencil arm spider assembly. An oscillating depressor spider is coaxially positioned above the rotatable pencil arm assembly and adjustable depressor elements cooperate with preset pencil selectors atop each pencil arm to force the rotating pencil arm assembly at each index position to deflect into only designated feed bowls.

3,616,943
STACKING SYSTEM

Delbert L. Brink, South Seattle, Wash., assignor to W. R. Grace & Co., Cambridge, Mass.

Filed Sept. 17, 1969, Ser. No. 858,746
Int. Cl. B65g *1/14*
U.S. Cl. 214—10.5 R **9 Claims**

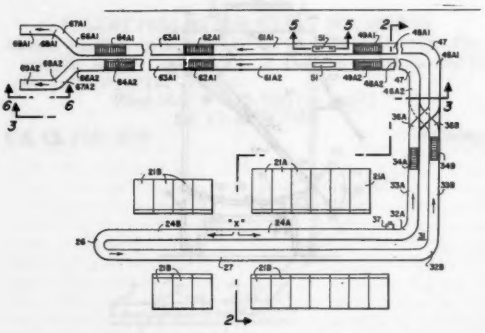


A body such as a box may be stacked with substantial rigidity and provided with the capability of spacing and staggering by providing single and/or multiple rows of protuberances such as beads on upper and lower surfaces arranged so that the beads nest or interlock upon stacking.

3,616,944
SYSTEM FOR FILLING ORDERS OF CUSTOMERS

Owen L. Field, Corona Del Mar, Calif., assignor to Glaser Bros., Los Angeles, Calif.

Filed Nov. 3, 1969, Ser. No. 873,185
Int. Cl. B65g *47/00*
U.S. Cl. 214—16 B **6 Claims**

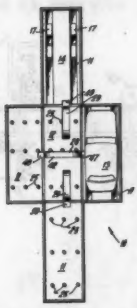


A conveyor system for efficiently filling, checking, loading and delivering a variety of items of merchandise to a large number of customers using a plurality of trucks. Salesmen's orders, each covering a large number of separate items, are written on two different forms (Form A for cigarettes, Form B for cigars, e.g.). The forms are then collated in accordance with preestablished route lists, listing for each truck delivery the customer stops in order. Orders are filled by warehousemen in reverse order of the route lists, Form A orders on conveyor A and Form B orders on conveyor B, the merchandise being moved along to a station, where the orders are packed up and taken to an invoice clerk for billing. Conveyor A has an elevator which places it immediately on top of conveyor B. Each conveyor has a switch making it possible to switch the merchandise to either of two parallel, double-deck storage conveyors of extended length leading to separate loading docks. All merchandise for a particular truck is stored on one of these storage conveyors while being invoiced and is then checked and loaded into the truck in inverse order of delivery, the Form A merchandise on a telescopic loading conveyor fitting into the front of the truck above the Form B merchandise.

3,616,945
CONSTRUCTION FOR STORAGE OF CARS

Nils A. S. Gynne, Valevagen 55, S-182, 64 Duursholm, Sweden

Filed Oct. 10, 1969, Ser. No. 865,401
Claims priority, application Sweden, Oct. 16, 1968, 13929/68
Int. Cl. B65g *67/00*
U.S. Cl. 214—16.1 CE **17 Claims**

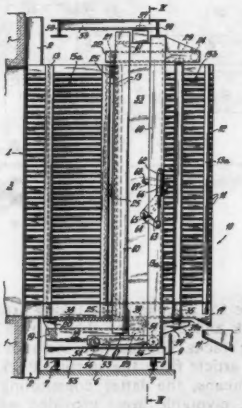


Automatic automobile parking is enabled by a parking system including rotational conveyor belts with fingers to engage parking pallets and shift them from parking spaces or elevators, for multiple storage. With an elevator system, storage may be more than one story.

3,616,946
SLAG-GUIDE CAR

Wilhelm Linnerz, Buttgen near Neuss, and Martin Bender, Duesseldorf-Eller, both of Germany, assignors to Hartung, Kuhn & Co. Maschinenfabrik GmbH, Duesseldorf, Germany

Filed Apr. 22, 1970, Ser. No. 30,756
Claims priority, application Germany, Apr. 23, 1969, P 19 20 603.2
Int. Cl. C10b *43/04, 25/14*
U.S. Cl. 214—18 R **10 Claims**



An elongated oven or furnace has a sidewall provided with at least one closable opening for the extraction of slag. A

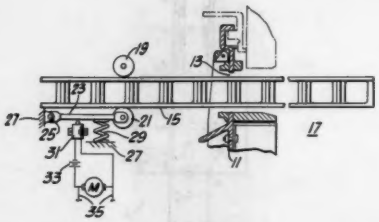
slag-removing carriage is movable along the sidewall and has a slag-guide chute having two-spaced parallel walls each composed of a section closer to and a section farther from the sidewall. The sections which are farther from the sidewall extend substantially normal to the latter, as do the other sections when the device is in operative condition, but the sections farther spaced from the sidewall are movable to a position of at least substantial parallelism with the sidewall when desired.

3,616,947

LOAD-SENSING DEVICE FOR A COKE OVEN LEVELING BAR

Linwood G. Tucker, Pittsburgh, Pa., assignor to Koppers Company, Inc.

Filed June 30, 1969, Ser. No. 837,705
Int. Cl. C10b 37/02
U.S. Cl. 214—23 4 Claims



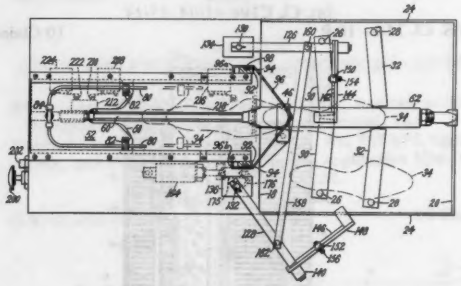
A leveling bar for a coke oven battery that deflects more than a preselected amount because of a deficiency of coal in a coking chamber, actuates a limit switch and the leveling bar retracts from the oven.

3,616,948

ARTICLE SEPARATING MACHINES

Herman A. Imhof, Hamilton, and Thomas G. Brophy, Gloucester, both of Mass., assignors to USM Corporation, Flemington, N.J.

Filed Apr. 30, 1970, Ser. No. 33,272
Int. Cl. B65g 57/10, 60/00
U.S. Cl. 214—6 DK 6 Claims



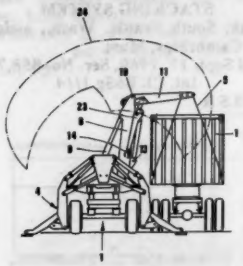
A machine for automatically taking articles from a single starting stack and depositing them on an alternate basis in two separate stacks. The machine includes means for advancing a single article from the starting stack cooperating with separating means, the latter constituting a pair of intercooperating, pivotable arms provided with article gripper heads and article stripping means located relative to separate stacking sites positioned effectively of the travel arc of each of the pivotable arms.

3,616,949

LOADING EQUIPMENT

Kaspar Klaus, 894 Memmingen, Illerstrasse 14, and Georg Felkel, 7951 Berkheim, both of Germany

Filed Mar. 17, 1970, Ser. No. 20,164
Int. Cl. B60p 1/48
U.S. Cl. 214—77 8 Claims



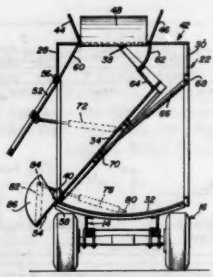
An operating agency, for instance, a piston-cylinder unit, is connected to the hoist arm of a loading appliance through a coupling system comprising at least two links which are pivotally connected to the hoist arm at positions spaced in the direction of hinging of the arm, and are pivotally connected to the connecting member, which itself is acted on by the operating agency, at positions offset in the opposite direction. This provides for a greater angular range of efficient operation by the hoist arm.

3,616,950

SIDE DUMPING AND LOAD COMPACTING VEHICLE

Alfred D. Coons, 668 Williams Ave., Seaside, Calif.

Filed Nov. 7, 1969, Ser. No. 874,886
Int. Cl. B60p 1/00
U.S. Cl. 214—82 8 Claims

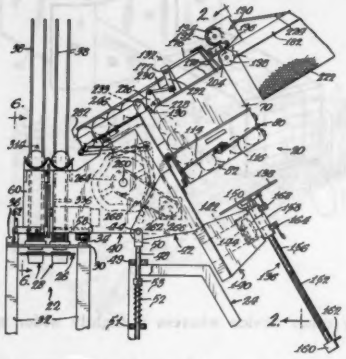


A trash receptacle including an open top through which trash may be downwardly admitted into the interior of the receptacle. A first sidewall portion of the receptacle is hingedly supported along its upper edge for inward swinging movement of the lower edge thereof toward the opposite sidewall of the receptacle for compacting trash between the first sidewall portion and the opposite sidewall of the receptacle. The opposite sidewall includes a second wall portion also hingedly supported along its upper and lower edge portion but for selective outward swinging movement of its lower edge portion upon inward swinging of the first wall portion for laterally ejecting compacted trash from the receptacle.

3,616,951
CARTON UNLOADING AND STACK TRANSFERRING APPARATUS

David L. St. Clari, Wilmette, and Martin Mueller, Glenview, both of Ill., assignors to Owens-Illinois, Inc.

Filed Sept. 30, 1969, Ser. No. 862,229
Int. Cl. B65b 21/02
U.S. Cl. 214—310 26 Claims

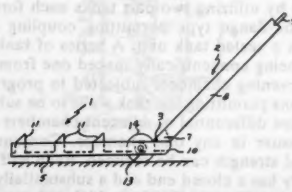


An apparatus for unloading stacks of containers from a carton and for transferring the stacks of containers to the sections of a hopper structure associated with a container filling machine. The apparatus includes a clamping structure for positively retaining the carton of containers and for placing the carton in slidable association on a frame above a stack elevator structure. The carton contains a plurality of layers of plural stacks with adjacent layers being separated by spacer sheets, and the apparatus includes means for removing the spacer sheets as the stacks of containers are lifted into position for movement down an inclined discharge ramp. The apparatus includes a transport mechanism for receiving stacks of containers from the discharge ramp and for transporting the stacks to a chute assembly. The transport means includes an inversion mechanism for dumping the stacks into the chute structure, and the chute structure is positioned to be moved into stack transferring relationship with respect to the sections of the hopper filling machine.

3,616,952
PALLET PULLER FOR HEAVY EQUIPMENT

Andres Aguilar, and Gerald E. Gerke, both of Boonville, Mo., assignor to the United States of America as represented by the Secretary of the Air Force

Filed Mar. 4, 1970, Ser. No. 16,511
Int. Cl. B60p 1/04
U.S. Cl. 214—372 2 Claims

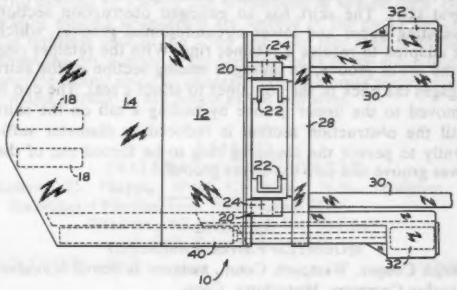


A structure is disclosed for quickly unloading trucks of heavy equipment and their support pallets. The structure comprises two composite beams formed of iron, integrally joined, and extending at about 135° with respect to one another. At the places where the beams meet, there is a relatively large roller which sets on the floor of the truck and permits the entire structure to move over the floor or platform. The horizontal beam is formed in two spaced arms or fork members formed of U-shaped iron and spanned by a metal plate, the members being adapted to be inserted into the usual slot in the sides or end of the pallet. Each horizontal arm is provided with three or more upstanding teeth portions secured within the legs of the U-shaped members and project a short distance above the upper edge of each member. When the equipment is loaded on top of the teeth by inserting the fork members into the pallet slots, a chain is connected to the uppermost end of the angularly extending beam and is attached to a simple and inexpensive pulling machine. A pull in the forward direction causes the angularly extending arm to move downwardly slightly as well as forwardly to cause the teeth to press into the bottom surface of the pallet at the slot and thus hold the equipment steady. The pallet and its load can then be pulled out of the truck by the machine mentioned and deposited at any desired position.

3,616,953
NARROW-AISLE TRUCK WITH RETRACTABLE ARMS

Walter M. Shaffer, Chesterland, and John T. Crawford, Lyndhurst, both of Ohio, assignors to Towmotor Corporation, Cleveland, Ohio

Filed Apr. 14, 1969, Ser. No. 822,843
Int. Cl. B66f 9/14
U.S. Cl. 214—730 7 Claims

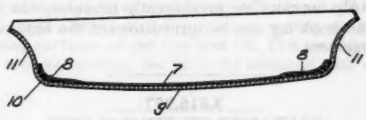


A narrow-aisle lift truck with a wheelbase which can be varied by hydraulic cylinders operable to extend and retract movable arms upon which are mounted nonsteerable wheels.

3,616,954
CONTAINER CLOSURES HAVING A THIN TRANSPARENT CENTRAL PORTION AND A CELLULAR ANNULAR PORTION

Robert Peck, Elmhurst, Ill., assignor to W. H. Hutchinson & Son, Inc., Chicago, Ill.

Division of Ser. No. 305,361, Aug. 29, 1963, Pat. No. 3,564,602.
Filed May 16, 1968, Ser. No. 729,671
Int. Cl. B65d 41/12, 41/22
U.S. Cl. 215—40 4 Claims



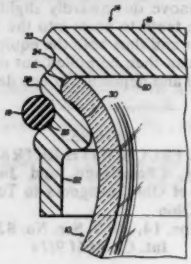
A sealing closure for a container comprising a closure member containing therein a plasticized, fused vinyl plastisol liner formed from a single homogeneous mass of material, the liner being bonded to the interior of the closure member. The liner has a central web portion and an outer ring portion, the central web portion containing a relatively thin, transparent area, and the outer ring portion being relatively thick, expanded, cellular, opaque, resilient and capable of being placed in sealing contact with the container.

3,616,955

CONTAINER CLOSURE WITH LOCKING RING

Vernon C. Heffran, Perrysburg, Ohio, assignor to Owens-Illinois, Inc.

Filed Sept. 12, 1969, Ser. No. 857,463
Int. Cl. B65d 5/36
U.S. Cl. 215—41 1 Claim



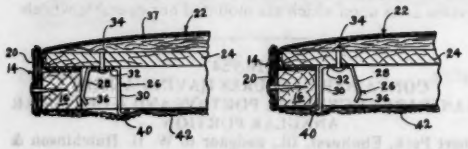
A reusable container closure utilizing a cap with an integral skirt. The skirt has an enlarged obstruction section separating upper and lower circumferential grooves, which are adapted to receive a retainer ring. With the retainer ring in the lower groove, an enlarged sealing section of the skirt engages the neck of the container to effect a seal. The cap is removed to the upper groove by pulling a tab on the skirt until the obstruction section is reduced in diameter sufficiently to permit the clamping ring to be forced out of the lower groove and into the upper groove.

3,616,956

MOUNTED PANEL ASSEMBLY

Joseph Cooper, Westport, Conn., assignor to Scovil Manufacturing Company, Waterbury, Conn.

Filed Mar. 2, 1970, Ser. No. 15,351
Int. Cl. B65d 43/00, 43/14, 43/02
U.S. Cl. 217—56 4 Claims



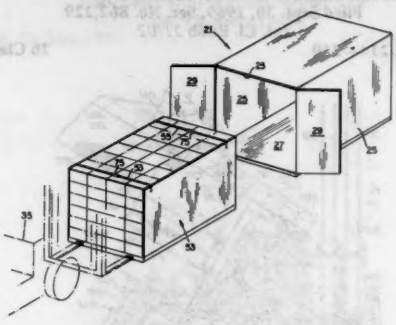
A panel has a number of clips which secure it to a base member. The clips, each fitting alongside an opening in the base member, comprises U-shaped elements swivelly attached to the panel. Depending on whether the panel is to be temporarily mounted or permanently mounted, the friction leg or the hook leg can be turned toward the base member for engagement.

3,616,957

CONTAINER STUFFING SLEEVE

Lawrence Alfred Patton, 1020 San Antonio Ave., Alameda, Calif.

Filed May 15, 1969, Ser. No. 825,007
Int. Cl. B65j 1/02; B65d 7/42
U.S. Cl. 220—1.5 1 Claim



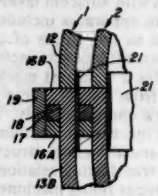
A cargo container combines an outer box and an inner stuffing sleeve. The sleeve is of such a size as to fully utilize the inner volume of the container when it is loaded with cargo. The sleeve may be provided with means on the bottom to allow relatively easy motion along the floor of the container or any other surface. The sleeve may also include apparatus for allowing the lateral expansion of the floor when it is to be used in a dry container as opposed to a refrigerated container or in any other device wherein a slightly wider space is required.

3,616,958

SEPARABLE PRESSURE TANK APPARATUS

Orson L. Mitchell, 132 Ronada Ave., Piedmont, Calif.

Filed Apr. 16, 1969, Ser. No. 816,744
Int. Cl. B65d 7/00, 53/00, 1/22
U.S. Cl. 220—3 3 Claims



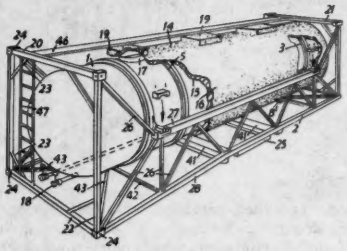
Pressure tank apparatus designed for pressure testing various samples must provide a quick and easy manner of mounting the specimen within the tank and of removing it subsequent to the testing procedure. Also, the pressure tanks should be as lightweight as possible consistent with the anticipated extreme pressures. Lightness and strength presently are provided by utilizing two-part tanks each formed with a special merlon-flange type permitting coupling of the two parts to form a sealed tank unit. A series of tanks are used, these tanks being concentrically spaced one from another to provide intervening chambers subjected to progressive pressure conditions permitting the tank walls to be subjected only to the pressure differential of adjacent chambers rather than the full pressure in any one chamber. Consequently, wall thickness and strength can be reduced. Each half of the two-part assembly has a closed end and a substantially cylindrical free end portion, the periphery of which is formed with merlon-type flanges spaced one from another by crenel-type notches. The spacing permits mating of the two parts by inserting the flanges of one part into the notches of the other and the flanges are provided with transverse recesses which, when the parts are mated, cumulatively form an outwardly facing, intermittent, circumferential channel adapted to receive a lock ring. If necessary, a clamping ring maintains the lock ring and an interior seal for the tank is provided by utilizing the interior pressure to press a sealing member tightly against the circumferential intermittent channel surface area.

3,616,959

CONTAINER

Francis Remesy, and Jean Vaillant, both of Route Nationale, St. Marcel, Marseille, France

Filed May 16, 1969, Ser. No. 825,219
Claims priority, application France, May 17, 1968, 22288
Int. Cl. B65d 57/00
U.S. Cl. 220—12 8 Claims



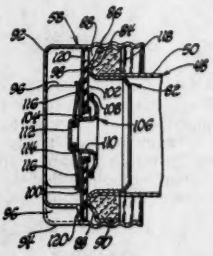
The invention provides a heat-insulated container for transcontinental transportation of liquids comprising a tank body and a rigid cradle to support the body, anchoring means being disposed at spaced points on the body and cradle to locate the body with respect to the cradle, the anchoring means including thermal insulation interposed between the tank body and the cradle, and some of the anchoring means being constructed to allow expansion and contraction of the tank body with respect to the cradle.

3,616,960

FILLER PIPE CLOSURE FOR PRESSURIZED FUEL TANK

Tom B. Miller, Grand Blanc, and Harold W. Noponen, Flint, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed May 20, 1970, Ser. No. 39,102
Int. Cl. B65d 41/04, 41/06
U.S. Cl. 220—39 3 Claims



A pressurized fuel tank, disposed transversely over the rear axle of an automobile, is divided by baffles into three compartments. Large apertures in the baffles interconnect the upper portion of the compartments and a pipe extending through the baffles interconnects the lower portion of the compartments. A fuel pump inlet is located in the center compartment adjacent an opening in the pipe. A pressure relief valve discharges from the center compartment adjacent the vehicle centerline. A filler pipe extends through one of the end walls and one of the baffles to discharge adjacent the vehicle centerline. A cap on the filler pipe is provided with a vacuum relief valve. Pressure in the tank is also released during removal of the cap.

3,616,961

EASY-OPENING CONTAINER WITH POUR SPOUT

Salvador C. Mallorca, Chicago, Ill., assignor to Continental Can Company, Inc., New York, N.Y.

Filed Apr. 30, 1970, Ser. No. 33,243
Int. Cl. B65d 17/24
U.S. Cl. 220—54 5 Claims

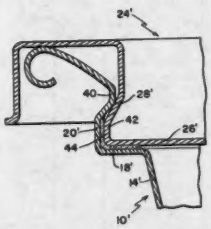
An easy-opening container including a panel having a tear strip defined by a score line terminating in spaced ends. Outwardly bulging projections are formed in the panel adjacent the terminal ends of the score line. The tear strip is foldable about the projections at the terminal ends of the score line to provide a pour spout of generally concave cross section along a major portion of the length of the tear strip.

3,616,962

SEALED CONTAINER OR CUP

Robert E. Phipps, West Campton, N.H., assignor to Sweetheart Plastics, Inc., Wilmington, Mass.

Filed Dec. 12, 1969, Ser. No. 884,647
Int. Cl. B65d 5/68, 43/10
U.S. Cl. 220—60 R 3 Claims



A plastic, disposable cup and lid including an easily broken seal consisting primarily of a narrow band of sealant such as paraffin which extends circumferentially about the mouth of the cup disposed between the mating regions of the cup and lip. The sealing band is applied in a thin film to the inner periphery of the cup or to the mating portion of the lid so that when they are assembled the paraffin band will be compressed slightly between and in intimate sealing contact with the mating surfaces of the cup and lid. This provides an effective seal, yet permits the lid to be removed with minimal effort.

3,616,963

POLYAMIDE EPOXY RESIN REACTION PRODUCT ADHESIVE

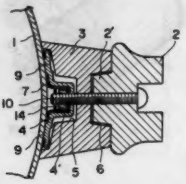
Kenneth M. Sinnott, Ellicott City, Md., assignor to W. R. Grace & Co., Hanover Square, New York, N.Y.

Continuation-in-part of application Ser. No. 553,658, May 31, 1966, now abandoned. This application Feb. 24, 1967, Ser. No. 618,344
Int. Cl. B65d 7/34; C08g 45/12
U.S. Cl. 220—81 4 Claims

This invention is directed to an adhesive consisting essentially of a transparent amorphous polyamide formed from terephthalic acid and an isomeric mixture of 2,2,4- and 2,4,4-

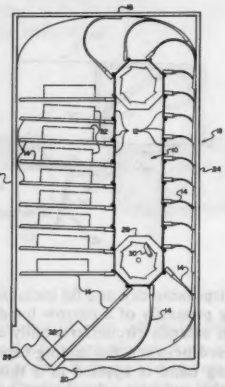
trimethylhexamethyenediamines in combination with an epoxy resin and laminates formed with such an adhesive.

3,616,964
MEANS FOR ATTACHING A HANDLE TO A PAN
Masaru Yamazaki, Hiroshima, Japan, assignor to Kansai Keikinzoku Kogyo Kabushiki Kaisha, Hiroshima Prefecture, Japan
Filed Nov. 28, 1969, Ser. No. 880,564
Claims priority, application Japan, Mar. 20, 1969, 44/20669
Int. Cl. B65d *25/28*
U.S. Cl. 220—94 R **3 Claims**



Means for attaching a handle to a pan comprising a mounting plate having a central projection, which plate is spot-welded to the pan, a heat-insulating member nearly identical in shape to said mounting plate positioned between said pan and mounting plate, and means for attaching a handle to the projection on said mounting plate, which means comprises an adjustable screw. The purpose of this invention is to fasten the handle to the pan in such a way that it remains firmly attached to the pan despite repeated heating and cooling.

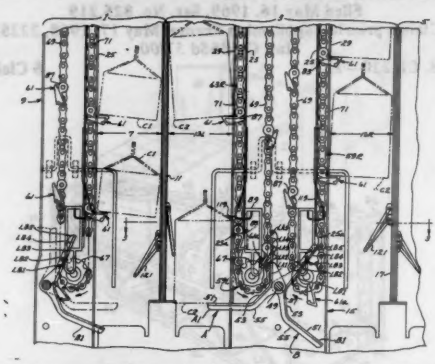
3,616,965
FLEXIBLE CONVEYOR BELT CARRIED CELLS FOR DISPENSING MACHINE
Leo S. Bendl, 274 Oradell Ave., Paramus, N.J.
Filed Aug. 11, 1969, Ser. No. 849,039
Int. Cl. G07f *11/00*
U.S. Cl. 221—84 **8 Claims**



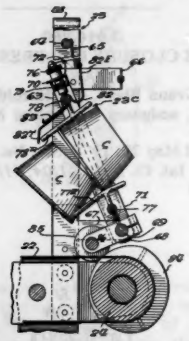
A vending machine having an endless, vertical conveyor, formed of flat, separable links and a flexible, resilient product-carrying shelf; each of the conveyor links being associated with a product-carrying shelf and being adapted to be engaged by an adjacent link and shelf such that when there is no product on the shelf (on the return movement), the shelf bends or pivots to thereby require less space between the conveyor and the backwall of the machine than between the conveyor and the front wall of the machine.

3,616,966
ARTICLE-DISPENSING APPARATUS
James T. Schuller, St. Louis County, and Leonard P. Falk, Florissant, both of Mo., assignors to UMC Industries, Inc., St. Louis, Mo.
Filed Sept. 10, 1969, Ser. No. 856,597
Int. Cl. G07f *11/64*
U.S. Cl. 221—84 **11 Claims**

Dispensing apparatus, for use in a vendor for cartons of milk, in which cartons are supported on pivoted drop shelves arranged in horizontal rows, the shelves in each row being controlled to swing downward one after another in sequence for dispensing successively from the shelves in the row, after which the shelves are returned to a raised position for holding cartons and then reloaded with cartons for the next dispensing sequence. Reloading of the drop shelves is by means of endless conveyors which carry rows of cartons for deposition on the drop shelves.



3,616,967
ARTICLE TRANSFER DEVICE
Martin Mueller, and Bernard Zurhoefer, both of Chicago, Ill., assignors to Owens-Illinois, Inc., Toledo, Ohio
Division of Ser. No. 677,698, Oct. 23, 1967, Pat. No. 3,526,075.
Filed Dec. 12, 1969, Ser. No. 889,783
Int. Cl. G07f *11/46*
U.S. Cl. 221—188 **7 Claims**

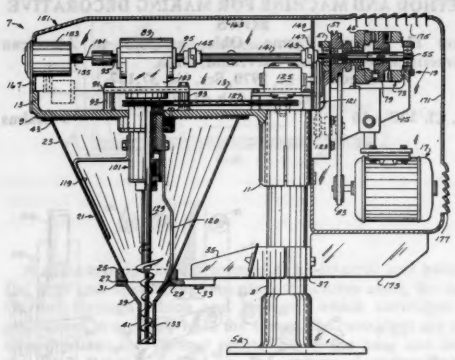


An apparatus for depositing side-by-side containers on a conveyor including a tilt mechanism journaled on a support frame and having side-by-side chutes for receiving articles therein. A gate normally blocks the article outlet ends of the chutes, and when the tilt mechanism is pivoted, the gates are moved to a clearance position so that the articles are free to move out of the chutes and on to the conveyor.

3,616,968
AUGER FILLER AND CONTROL THEREFOR
Robert C. James; Charles G. Hart, Sheboygan, Wis.; John E. Rogers, Suffolk, England, and Richard W. Safranski, Sheboygan, Wis., assignors to Hayssen Manufacturing Company, Sheboygan, Wis.
Filed Apr. 10, 1969, Ser. No. 814,957
Int. Cl. B65g *33/10*; B65d *5/30*; F16d *67/06*
U.S. Cl. 222—70 **19 Claims**

An auger filler for rapid and accurate dispensing of metered quantities of fluent products in which an auger is operated via an electromagnetic clutch and brake unit with reduction gearing between the clutch output and the auger for driving the auger at a lower speed than the clutch output. The unit has a rated voltage and a rated torque, the rated torque being greater than that for driving the auger under load, and provision is made for energizing the clutch at the

start of a fill cycle at overexcitation voltage and then dropping the voltage to a holding voltage substantially below the rated voltage, and for deenergizing the clutch at the termination of a fill cycle and energizing the brake at overexcitation voltage and then dropping the voltage to a



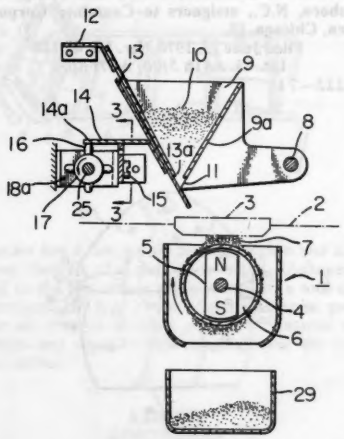
holding voltage substantially below the rated voltage. A timer effects disengagement of the clutch to stop the auger and means is provided for delaying initiation of the operation of the timer until the auger has rotated a predetermined amount less than the predetermined number of revolutions in a fill cycle.

3,616,969

DEVELOPER REPLENISHING MEANS FOR AN ELECTROSTATOGRAPHIC APPARATUS

Yutaka Koizumi, Tokyo, Japan, assignor to Kabushiki Kaisha Ricoh, Tokyo, Japan

Filed May 16, 1968, Ser. No. 729,757
Claims priority, application Japan, May 25, 1967, 42/33304
Int. Cl. G01f *11/00*
U.S. Cl. 222—162 **7 Claims**



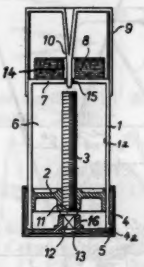
Apparatus is provided for replenishing developer in an electrostatographic device. The apparatus includes a hopper having discharge apertures and is caused to vibrate above a developing device to replenish same with developer. A pusher plate projects into the hopper to engage the developer and force same through the apertures as the hopper vibrates.

3,616,970

CONTAINER CONSTRUCTION FOR DISPENSING A PASTY MASS OR THE LIKE

Manfred Baumann, Heerbrugg, and Alois Stahl, Diepoldsau, both of Switzerland, assignors to Baumann AG, Diepoldsau, Switzerland

Filed Nov. 12, 1968, Ser. No. 774,834
Claims priority, application Switzerland, Feb. 13, 1968, 2094/68
Int. Cl. B67d *3/00*
U.S. Cl. 222—187 **1 Claim**



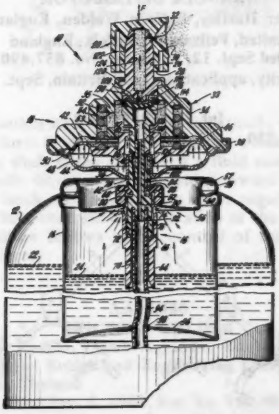
There is disclosed a container construction for storing and discharging a pasty mass which incorporates a sleeve member for the pasty mass and a piston mounted in the sleeve member. A threaded spindle serves to axially displace the piston. Such sleeve member possesses a cover member at the end thereof from which the pasty mass is discharged. An applicator element is situated at such discharge end of the sleeve member for distributing the pasty mass. The cover member is equipped with at least one discharge opening for the pasty mass and this discharge opening is narrow in relation to the diameter of the sleeve member.

3,616,971

DISPENSER AND METERING VALVE THEREFOR

Louis F. Kutik, Broward County, Fla., assignor to Precision Valve Corporation, Yonkers, N.Y.

Filed Feb. 24, 1970, Ser. No. 13,578
Int. Cl. G01f *11/04*
U.S. Cl. 222—249 **14 Claims**

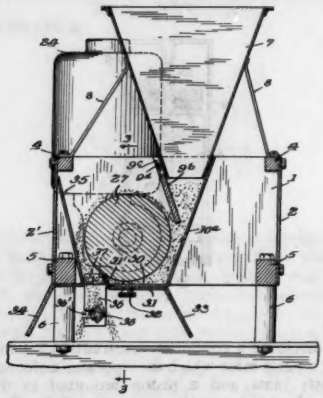


This invention comprises an improved dispenser including a propellant container having a positive displacement dispenser attached thereto, propellant flow being controlled by a manually operable valve and product metering, being controlled by a pressure differentiated valve. The propellant vapor acts upon a pistonlike member which forces a metered quantity of product from the dispenser.

3,616,972
MACHINE FOR DISPENSING AND DISTRIBUTING DRY FLOWABLE MATERIALS

Daniel Lamar Christy, R.F.D. 5, Fremont, Ohio

Division of Ser. No. 641,725, Apr. 26, 1967, abandoned.
Filed Sept. 18, 1969, Ser. No. 871,404
Int. Cl. G01f 11/00
U.S. Cl. 222—317 9 Claims

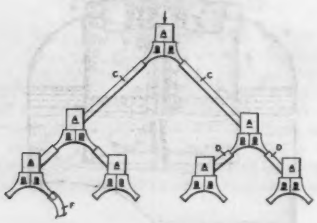


A machine for effecting the controlled dispersed or disseminated discharge of dry or substantially dry edible or nonedible products consisting of a walled body receiving and supporting a hopper having a dispensing roll rotatably mounted within the same laterally of its discharge way in communicative relation thereto, a pair of converging flow-directing and regulating cute plates on the hopper sidewalls communicating with its discharge way, one of which is fixed and the other vertically adjustable whereby to effect a variable discharge of material onto one side of the roll and its carriage thereover for free and disseminated downward discharge from its opposite side.

3,616,973
GRANULE DISTRIBUTOR

Gilbert Spencer Hartley, Saffron Walden, England, assignor to Fisons Limited, Felixstowe, Suffolk, England

Filed Sept. 12, 1969, Ser. No. 857,490
Claims priority, application Great Britain, Sept. 17, 1968, 44068/68
Int. Cl. G01f 11/00
U.S. Cl. 222—330 20 Claims

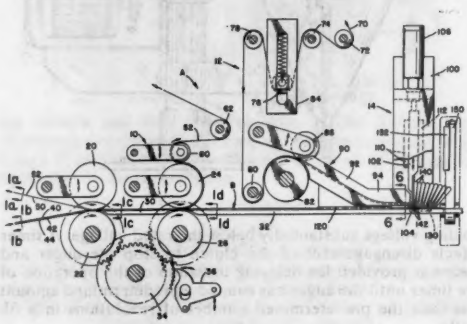


As apparatus for the distribution of granules or particles. The apparatus has a cascade of riffles with means for supplying granules to the first riffle. The first riffle divides the supply of granules into at least two streams, and means are connected between the first riffle and at least two subsidiary riffles of the cascade to pass the streams to the subsidiary riffles. Means can also be provided to pass streams from the subsidiary riffles to at least one further subsidiary of riffles. Means is also provided for passing the streams of granules or particles from the terminal riffles of the cascade to a distribution means.

3,616,974
METHOD AND MACHINE FOR MAKING DECORATIVE BOWS

Grant H. Jordan, Parma, Ohio, assignor to American Greetings Corporation, Cleveland, Ohio

Filed May 14, 1970, Ser. No. 37,167
Int. Cl. A41h 43/00
U.S. Cl. 223—46 9 Claims

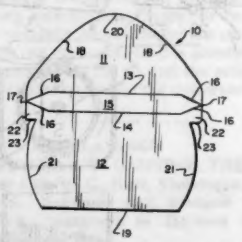


An apparatus and method for making a decorative bow including means for bringing together in converging paths a backing strip and a decorative ribbon. The ribbon is moved more rapidly than the backing strip, and by intermittently connecting the ribbon to the backing strip a plurality of ribbon loops are formed along the backing strip.

3,616,975
SUPPORT CARD FOR DISPOSABLE UNDERGARMENTS

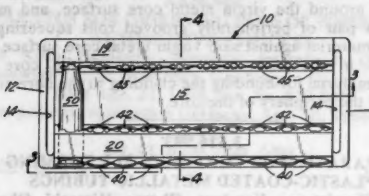
Peter C. Collura, Stamford, Conn., and Philip W. Lewis, Greensboro, N.C., assignors to Container Corporation of America, Chicago, Ill.

Filed June 23, 1970, Ser. No. 49,128
Int. Cl. A41h 5/00; A47f 8/00
U.S. Cl. 223—71 5 Claims



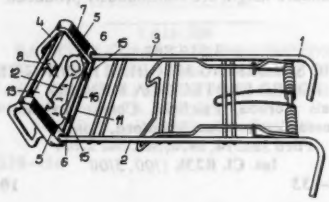
A support card for one or more disposable female undergarments known in the trade as "panties." The card is loaded with the garments while held in stiffened position in a jig which curves the card transversely of spaced laterally extending score lines. The card is folded upon itself after being loaded with a plurality of such garments, and the card is shaped in such a fashion that leg openings of the garment are retained at protuberances from the edges of the card.

3,616,976
GUN CARTRIDGE HOLDER
George J. Geretschlaeger, Stillwater, Minn., assignor to Federal Cartridge Corporation, Minneapolis, Minn.
Filed Jan. 26, 1970, Ser. No. 5,760
Int. Cl. F42b 39/08
U.S. Cl. 224—21 7 Claims



A gun cartridge holder formed as an integral unit having a flat base and upstanding mounting structures along the edges thereof through which and between which cartridges are positioned to securely hold the same. The cartridges are positioned within the vertical projection of the base and below the top of the mounting structures to provide a cartridge holder which may be used as a packing structure for cartridges and which also may be used as a carrying holder for cartridges for usage. The individual holders serve as holders and spacers in packing and also as a means for positioning a belt therethrough to carry the cartridge holder.

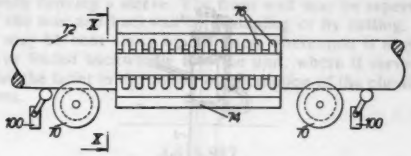
3,616,977
COMBINATION TOOL CARRIER AND CYCLE LUGGAGE RACK
Emil Zurmuhlen, Brackwede, Germany, assignor to Firma ESGE-Marby Gesellschaft mit beschrankter Haftung & Co., Brake Bielefeld, Germany
Filed July 25, 1969, Ser. No. 844,769
Claims priority, application Germany, July 26, 1968, P 17 80 044.1
Int. Cl. B62j 7/00
U.S. Cl. 224—32 4 Claims



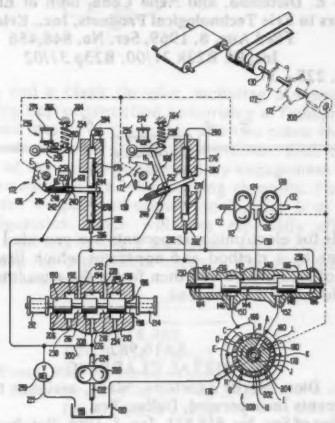
The carrier has a flat article support region and an article counterstop formed of a pair of inverted, U-shaped bends connected to the flat article support region; a tool carrier is located between the legs of the U-shaped bends, preferably formed as an integral molding of plastic material together with bumper and counterstrips snapped over the U-shaped legs of the carrier.

3,616,978
CONVEYORS
James F. Haslam, Kettering, England, assignor to Stewarts and Lloyds Limited, Glasgow, Scotland
Filed July 18, 1968, Ser. No. 745,757
Claims priority, application Great Britain, July 26, 1967, May 5, 1968, 34,455/67; 20,970/68
Int. Cl. B65h 17/28
U.S. Cl. 226—93 4 Claims

A conveyor has a linear motor for accelerating or decelerating objects by magnetic induction as the objects travel over rollers. The rollers are adapted to the shape of the objects and the motor may extend around the path of the objects. Control means actuated by the objects control the energization of the motor.



3,616,979
HYDRAULIC STEPPING MECHANISM FOR FORMS FEEDING
Stanley C. Titcomb, Endwell, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Dec. 23, 1969, Ser. No. 887,474
Int. Cl. B65h 17/22
U.S. Cl. 226—157 12 Claims

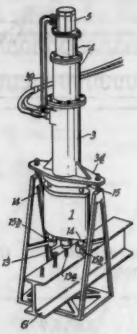


A two-position stepping valve automatically releases a first detent of a form feed drive shaft to allow a fluid motor to accelerate the shaft under control of a fluid commutator, and simultaneously drives a second detent toward shaft latching position to latch the same after a short angular rotation of the same. Fluid controlled deceleration of the shaft into full latched position follows under control of the shaft driven fluid commutator.

3,616,980
FRICTION WELDER
John Arthur Padilla, Cambridgeshire, England, assignor to The Cleveland Bridge and Engineering Company Limited, Darlington, England
Filed Dec. 2, 1968, Ser. No. 780,406
Claims priority, application Great Britain, Dec. 12, 1967, 56,510/67
Int. Cl. B23k 27/00
U.S. Cl. 228—2 4 Claims

A friction welding apparatus includes a support, a headstock carrying a rotatable chuck for holding a first workpiece to be welded to a second static workpiece, the headstock being mounted on the support for movement axially of the chuck. Piston and cylinder type displacement means are con-

nected between the headstock and the support for producing axial movement of the headstock and the chuck is provided



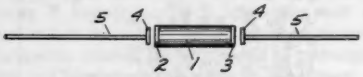
with rotary drive means incorporating a shaft passing coaxially through the cylinder of the piston and cylinder device.

3,616,981

LEAD AND SOLDER PREFORM ASSEMBLY AND METHOD OF MAKING THE SAME

Francis E. Dieteman, and Nello Coda, both of Erie, Pa., assignors to Erie Technological Products, Inc., Erie, Pa.

Filed Aug. 8, 1969, Ser. No. 848,456
Int. Cl. B23k *21/00*; B23p *31/02*
U.S. Cl. 228—3 **4 Claims**



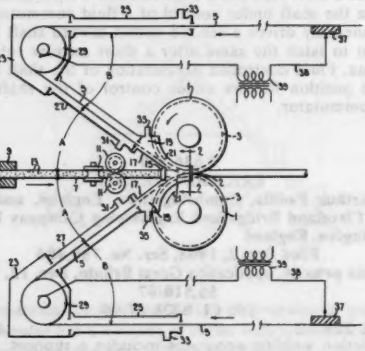
Leads for electronic components are provided with solder preforms by a method and apparatus which first cuts off a length of solder wire and then forms the wire into a preform and cold-welds it to the lead.

3,616,982

METAL CLADDING

Paul A. Dion, North Attleboro, Mass., assignor to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 518,821, Jan. 5, 1966, Pat. No. 3,408,727.
Filed May 22, 1968, Ser. No. 748,885
Int. Cl. B23k *1/20*
U.S. Cl. 228—5 **11 Claims**



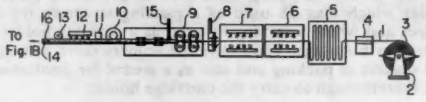
Apparatus for solid-phase metallurgically bonding metal cladding materials such as copper to a wirelike core of aluminum or the like is shown to include means such as an annular shaving die for cutting metal materials from the entire periphery of the wirelike core to expose a virgin metal surface therearound, means such as a manifold establishing a protective or oxide-reducing atmosphere around the virgin metal core surface for maintaining the virgin metal surface free of bond deterrents, means direction clean metal cladding materials around the virgin metal core surface, and means such as a pair of peripherally grooved rolls squeezing the cladding material against said virgin metal core surface with reduction in the composite thickness of the core and cladding material for bonding the cladding to the core entirely around the periphery of the core.

3,616,983

APPARATUS FOR CONTINUOUSLY FORMING PLASTIC-COATED METALLIC TUBINGS

Noboru Kamimura; Yasutaro Ohara; Hirasahi Okazaki; Toshiharu Koyama, and Kazuyuki Kamino, all of Kadomashi, Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan

Filed Dec. 11, 1968, Ser. No. 782,893
Claims priority, application Japan, Dec. 27, 1967, Dec. 27, 1967, 42/83859; 42/83860
Int. Cl. B23k *1/20*
U.S. Cl. 228—5 **1 Claim**



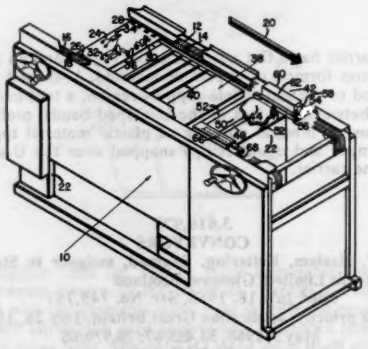
An apparatus for continuously manufacturing metallic tubings having a plastic coating thereon. The apparatus is adapted to form a long extending metallic tube initially from a metal strip and then, to apply the plastic coating to inner and outer surfaces of the long extending tube or either one of them as desired while the tube is transported to output side of the apparatus, where such tube already coated is sheared into a standard length of the tubings, all in a continuous manner. The apparatus contains all necessary treating means for respective operations as a unit assembly, so that the respective operations are successively carried out with respect to the long uninterrupted tube, and the coated tubings of standard length are continuously produced.

3,616,984

AUTOMATIC SOLDERING MACHINE HAVING CIRCUIT BOARD PROTECTION MEMBER

William Louis Voroba, Fairfield, Conn., assignor to The Bunker-Ramo Corporation, Stamford, Conn.

Filed Jan. 14, 1970, Ser. No. 2,744
Int. Cl. B23k *1/00, 5/00*
U.S. Cl. 228—33 **10 Claims**



An automatic soldering machine having one or more strips positioned in the solder pool to prevent the application of

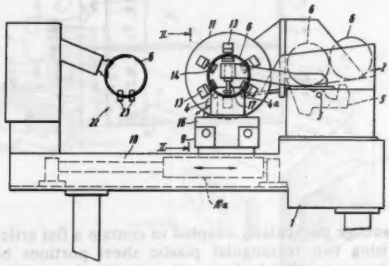
solder to selected areas of a circuit board. The strip is of a material which has stable dimensions and is heat resistant to a temperature at least equal to melting temperature of the solder utilized, is resistant to the accumulation of solder, and is preferably of a low-friction material.

3,616,985

APPARATUS FOR ORIENTING RIMS OF WHEELS FOR AUTOMOTIVE VEHICLES

Ulrich Koch, Hamburg, Germany, assignor to Ottensener Eisenwerk GmbH, Hamburg, Germany

Filed Apr. 21, 1969, Ser. No. 817,742
Claims priority, application Germany, Apr. 20, 1968, P 17 52 208.6
Int. Cl. B23k *1/00, 5/00*
U.S. Cl. 228—18 **18 Claims**



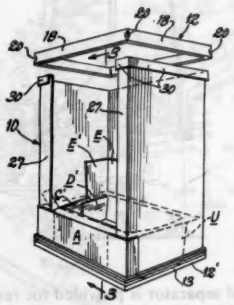
Apparatus for orienting semifinished automobile wheel rims which are formed with radially extending gaps comprises a chute which delivers successive rims into registry with a rotary disk and with a pusher which transfers successively delivered rims into the range of clamping members on the disk. A radially extending pin is thereupon rotated through 360° within the thus clamped rim to enter the gap and to rotate the rim and the disk until the gap is located in a predetermined angular position. The thus oriented rim is thereupon transferred into a welding machine while the angular position of its gap remains unchanged.

3,616,986

BATHTUB CONTAINER-PROTECTOR

Raymond E. Wolfe, Beaver Falls, and David H. Marshall, New Castle, both of Pa., assignors to Universal-Rundle Corporation, New Castle, Pa.

Filed Oct. 3, 1969, Ser. No. 864,298
Int. Cl. B65d *5/12*
U.S. Cl. 229—16 **3 Claims**



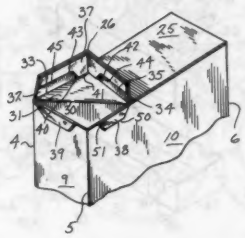
A container for a bathtub-shower unit which serves as a shipping carton and also to protect the unit from damage during installation. The container may be formed of heavy, stiff fiberboard or the like, of the character commonly employed for packing and shipping merchandise of a fragile character, and is in the form of a hollow parallelepiped or generally cubical form, with top and bottom caps and sidewalls forming a sleeve. The front wall may be separated from the side and backwall by unstapling or by cutting, and then may be bent along scored lines, whereupon it may be bent or folded backwardly into the unit, where it serves to protect the latter in the course of installation of the plumbing fixtures.

3,616,987

CARTON WITH RECLOSABLE CORNER PORTION

Robert A. Krzyzanowski, Milwaukee, Wis., assignor to Milprint, Inc., Milwaukee, Wis.

Filed Mar. 2, 1970, Ser. No. 15,331
Int. Cl. B65d *5/72*
U.S. Cl. 229—17 R **3 Claims**



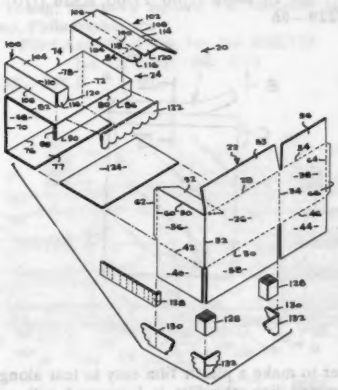
A carton, and a blank therefor, including a wraparound corner locking flap construction comprising a T-shaped first element joined to part of the carton and two other elements joined to another part of the carton. Reclosure after the initial opening of the carton is obtained by engagement of the T-shaped element with the other locking elements. The construction of the wraparound corner locking flap is of a particular configuration which will give especially effective reclosure of a carton having a wall panel with a corner portion which can be articulated about a diagonal fold line formed in such wall panel.

3,616,988

STORAGE CHEST

Graham H. Weant, 908 Taylor St., Tupelo, Miss.

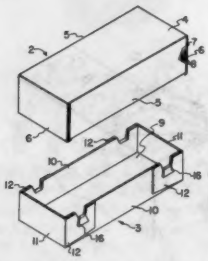
Filed Apr. 2, 1970, Ser. No. 25,146
Int. Cl. B65d *13/04*
U.S. Cl. 229—23 A **12 Claims**



A storage chest constructed of corrugated board formed of a main panel member forming a front wall connected to two end walls by vertical fold lines with floor support panels ex-

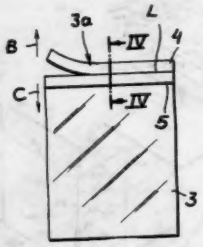
tending from the front and end walls along horizontal fold lines and a mating panel integrally defining a rear wall, a rear floor support panel and a lid with the rear wall connected to the rear edges of the sidewalls and a separate floor member inserted within the confines of the front, rear and sidewalls, the entire structure being supported by support legs in the form of squared convolutions of a strip of corrugated material and with each corner of the chest provided with cover plates embracing the lower portions of each corner and each leg.

3,616,989
TELESCOPING CARTON ASSEMBLY
Harold H. Martinek; George M. Wilmsen; Clifford L. Steffen, Danville, Ill., and Thomas W. Martinek, Covington, Ind., assignors to Tee-Pak, Inc., Chicago, Ill.
Filed Sept. 12, 1969, Ser. No. 857,511
Int. Cl. B65d *5/30*
U.S. Cl. 229—32 **10 Claims**



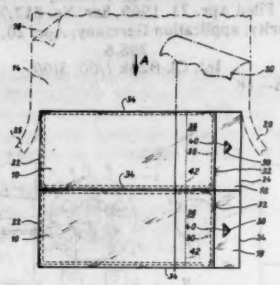
Carton assembly for sausage casings and the like formed of two rectangular boxes assembled to provide a closed receptacle consisting of a top box having a bottom box telescoping therefrom. The two boxes are formed of blanks respectively folded into locking or semilocking positions. Locking of the top box is through end tabs folded into the box interior. The bottom box is locked or semilocked by means of a positioning of locking tab flaps in slots on cooperatively engaging flaps of the bottom box blank. The top box can be provided with an openable side flap whereby the carton assembly has an easy open end or side.

3,616,990
EASY-TEAR ARRANGEMENT FOR STRETCHABLE PLASTIC FILM
Joseph J. Powell, 87-50 Kingston Place, Jamaica, N.Y.
Filed May 1, 1969, Ser. No. 820,928
Int. Cl. B65d *17/00, 11/00;* **B32b** *3/10*
U.S. Cl. 229—66 **9 Claims**



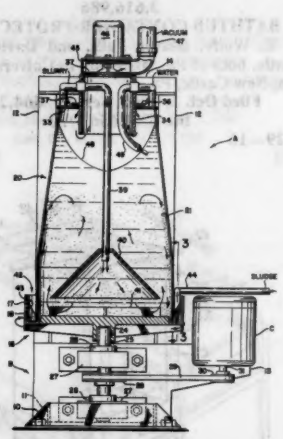
In order to make a plastic film easy to tear along a regular predetermined line, the film is laminated with a relatively nonstretchable strip. This strip can be of paper or textile and can be subdivided, scored or perforated to define the predetermined tear line. Furthermore, two strips of such nonstretchable material which lie next to each other with a maximum spacing much less than the width of the strip are used to provide a tear line between them.

3,616,991
PACKAGE FOR FLAT ARTICLES
Hans Beck, Urbanstrasse 27, 7440 Nurtingen, Germany
Filed Sept. 26, 1969, Ser. No. 861,290
Claims priority, application Germany, Oct. 2, 1968, G 68 00 417.1
Int. Cl. B65d *33/14*
U.S. Cl. 229—66 **1 Claim**



A package particularly adapted to contain a flat article and comprising two rectangular plastic sheet portions bonded firmly to one another by four seals extending immediately adjacent the four sides of said flat article; the plastic sheet portions, in a face-to-face relationship, extend beyond one of said seals away from said article to form a handling flap provided with an opening for suspension and bonded together at their edges spaced from, and parallel with said last-named seal.

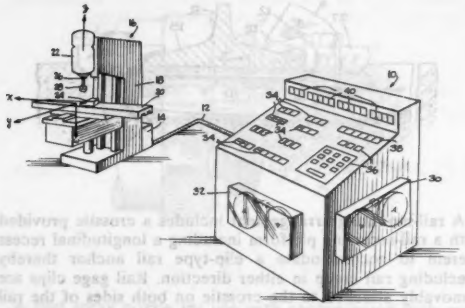
3,616,992
PARTIAL VACUUM CENTRIFUGAL SEPARATOR
James S. Deacon, 4492 Camellia Lane, North Olmsted, Ohio
Filed June 6, 1969, Ser. No. 831,180
Int. Cl. B01d *21/26, 43/00, 45/12*
U.S. Cl. 233—1 A **9 Claims**



A centrifugal separator is provided for removing solid particles entrained in a liquid slurry. A column of liquid is maintained in a rotating open bottom drum by vacuum pressure and the lower end of the drum is received in a shallow basin of a coaxially rotating table. Entrained solid particles are moved by centrifugal action to an annular zone adjacent the wall of the drum where they gravitate and concentrate in a

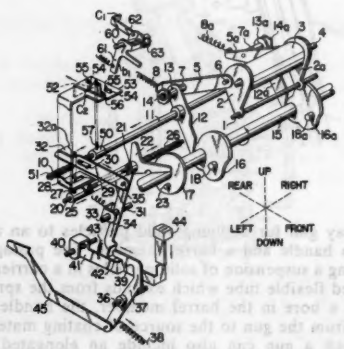
perimetric zone of the shallow basin outside of the drum wall, and are then removed in the form of sludge. Clarified liquid is removed from the top of the central core zone of the liquid in the drum.

3,616,993
NUMERICAL CONTROL SYSTEM
Richard McGuire, Smithtown, and John C. Maddock, Deer Park, both of N.Y., assignors to Logic Systems, Inc., Great Neck, N.Y.
Filed Dec. 4, 1968, Ser. No. 781,197
Int. Cl. G06k 1/02
U.S. Cl. 234—17 13 Claims



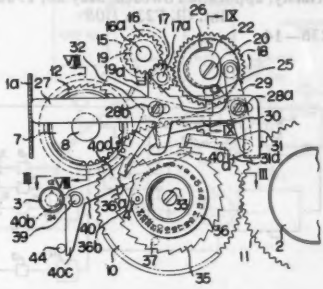
A programming arrangement for machine tools wherein address characters are presented sequentially and call sequentially for the insertion of data, the data being registered on a block-by-block basis and transferred so as registered into a machine control logic unit; and a machine control logic unit providing automatic direction sensing, speed control, backlash and tool compensation and accurate motor drive control.

3,616,994
PRINTING DEVICE IN A RECORDING CALCULATOR OR THE LIKE
Rii Watanabe, Tagata-gun, Shizuoka-ken; Takashi Murakami, Mishima-shi, and Kiyokazu Kobayashi, Tagata-gun, Shizuoka-ken, all of Japan, assignors to Tokyo Denki Kabushiki Kaisha, Tokyo-to, Japan
Filed June 7, 1968, Ser. No. 735,244
Int. Cl. G06c 29/00
U.S. Cl. 235—58 P 5 Claims



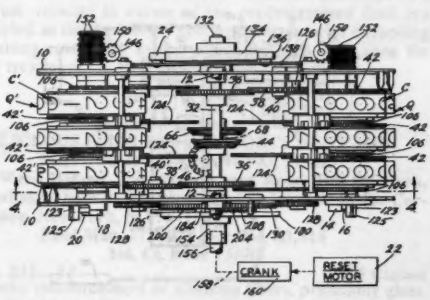
The platen of a printing device in a recording calculator can be moved into and out of printing position by engaging and disengaging an actuating linkage with and from a driving mechanism by means of a control device, whereby printing is selectively carried out or not carried out. This movement of the platen is utilized also to rotate the platen and advance the recording sheet through relatively large increments of advance to improve legibility of printed numerals and facilitate detection of errors.

3,616,995
FILM COUNTER DEVICE FOR USE WITH A CAMERA USING NONPERFORATED FILM
Sakae Fujimoto, Tokyo, Japan, assignor to Kabushiki Kaisha Ricoh, Tokyo, Japan
Filed Oct. 30, 1968, Ser. No. 771,779
Claims priority, application Japan, Nov. 7, 1967, 42/71560
Int. Cl. G06m 1/00
U.S. Cl. 235—91 C 1 Claim



A film counter device for use with a camera using nonperforated film provided with a cam in the form of a cardioid adapted to rotate in response to the rotation of a film winding spool. A pair of notched disks is disposed coaxially of said cam with each having only one notch with means for deviating or coinciding the notches in phase. A lever is provided whose one end is adapted to press against the cam while the other drives a film counter numeral indicating disk; and another lever is provided whose one arm is adapted to drop into both of the notches when the cam and the disks make substantially one rotation respectively so that the notches coincide in phase (in this case the numeral-indicating disk being rotated by one numeral) and whose other arm is provided with a lever adapted to prevent the rotation of the film winding spool.

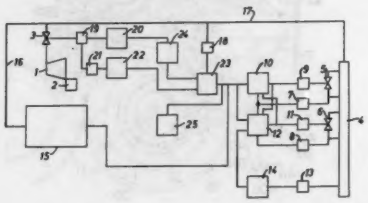
3,616,996
REGISTER RESETTING MECHANISM
Einar T. Young, Newtown Square, Pa., assignor to Sun Oil Company, Philadelphia, Pa.
Filed Aug. 18, 1969, Ser. No. 850,739
Int. Cl. G04f 1/06, 1/08
U.S. Cl. 235—144 D 8 Claims



A register has a plurality of groups of decimally related number wheels which are driven during a dispensing opera-

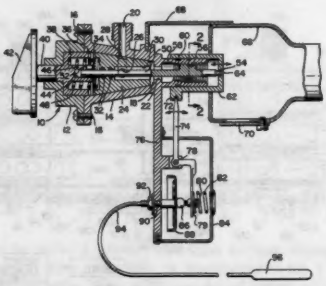
tion to indicate the quantity and cost of a commodity being dispensed. A resetting mechanism functions to un couple the wheels from the driving means, to reset the wheels to zero, and then to recouple the wheels to the driving means, in response to the rotation of a reset shaft in one direction through a portion of a revolution, followed by the rotation of this shaft in the reverse direction back to its original position. The reciprocatory rotation of the reset shaft is effected by means of a reset motor which typically also effects other resetting and adjustment or setting operations in a selective dispensing apparatus.

3,616,997
COMBUSTION REGULATOR
Jerk Gunnar Oldenburg, Genarp, Sweden, assignor to Kockums Mekaniska Verkstads AB, Malmo, Sweden
Filed May 19, 1969, Ser. No. 825,694
Claims priority, application Sweden, May 20, 1968, 6794/68
Int. Cl. F23n *1/08*
U.S. Cl. 236—14 **14 Claims**



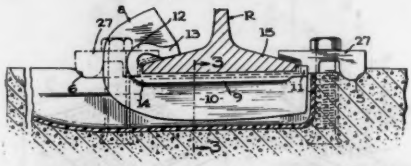
A combustion-regulating system for steam boilers including a stem pressure transducer and a steam pressure requirement signal connected to a proportional circuit and integrating circuit, whose output is connected to an input of an amplifier stage which is differentially connected and contained in a first control circuit, whose output is connected with a positioning unit contained in the first control circuit. Said amplifier stage is also connected to an input of a second differentially connected amplifier stage connected in a second control circuit, whose output is connected with a positioning unit contained in the second control circuit. The input of the amplifier stage of the first control circuit is connected to the fuel oil pressure transducer and the input of the amplifier stage of the second control circuit is connected to an air flow sensing device and a fuel oil pressure transducer.

3,616,998
THERMOSTATIC CONTROL DEVICE
Frank H. Schneider, Richmond, Va., assignor to Robertshaw Controls Company, Richmond, Va.
Filed Oct. 7, 1969, Ser. No. 864,404
Int. Cl. G05d *23/12*
U.S. Cl. 236—99 **13 Claims**



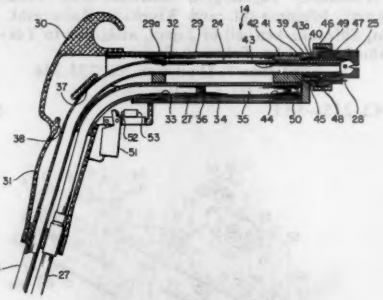
A thermostatic control device controlling the flow of fuel to a gas burner and including a pair of movable valve elements with temperature-setting means positioning one of the valve elements at a position corresponding to a desired temperature setting, and thermal-responsive means operatively connected to move the other valve element in response to temperature variations from the desired temperature setting.

3,616,999
RAIL FASTENER ASSEMBLY
Emerson J. Ruble, Hinsdale, Ill., assignor to Portec, Inc., Oak Brook, Ill.
Filed Nov. 7, 1969, Ser. No. 874,869
Int. Cl. E01b *13/00, 09/00*
U.S. Cl. 238—315 **12 Claims**



A rail-mounting arrangement includes a crosstie provided with a rail-receiving platform including a longitudinal recess therein to accommodate a clip-type rail anchor thereby precluding rail creep in either direction. Rail gage clips are removably attached to the crosstie on both sides of the rail base to maintain the prescribed gage and include means to prevent displacement thereof during the inherent rail wave motion.

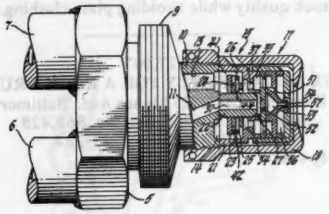
3,617,000
SPRAY GUN FOR APPLYING SOLID PARTICLES
Richard O. Probst, and Kenneth E. Pollard, both of Indianapolis, Ind., assignors to Ransburg Electro-Coating Corp., Indianapolis, Ind.
Filed June 16, 1969, Ser. No. 833,352
Int. Cl. B05b *5/02*
U.S. Cl. 239—15 **17 Claims**



A spray gun for applying solid particles to an article includes a handle and a barrel member. The passageway for conveying a suspension of solid particles in a carrier gas is an elongated flexible tube which extends from the spray nozzle through a bore in the barrel member, the handle and outwardly from the gun to the source of coating material particles. Such a gun can also include an elongated insulator forming a passageway for high-voltage circuit means within the gun and curved between the grip portion of the handle and another bore in the barrel. A closure means of insulating material at the front of the barrel can include a portion projecting into the barrel to provide electrical insulation for the connection between the high-voltage circuit means and an

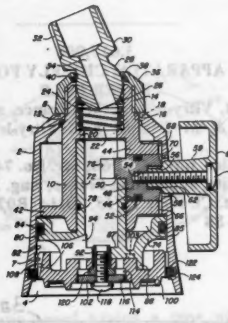
electrode mounted on the front of the spray gun. The closure means can also provide a means for attaching a spray nozzle at the front of the gun.

3,617,001
FUEL NOZZLE CONTAMINANT TRAP
Richard G. Grundman, Marne, Mich., and Cecil H. Sharpe, Brownsburg, Ind., assignors to General Motors Corporation, Detroit, Mich.
Continuation of application Ser. No. 617,164, Feb. 20, 1967, now abandoned. This application Nov. 14, 1968, Ser. No. 778,002
Int. Cl. F02m *55/00*
U.S. Cl. 239—86 **14 Claims**



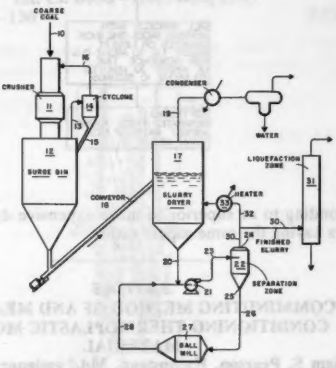
A fuel spray nozzle for use with contaminated fuels embodies a trap for particles such as sand grains and lint. One form is made up of disks with radial slots and rings or flanges defining circumferential bars, to provide plural tortuous restricted flow paths ahead of the nozzle swirl ports. The other form has radial passages joining concentric annular axial passages.

3,617,002
SHOWER HEAD
Paul C. Symmons, Newton, Mass., assignor to Symmons Engineering Company, Braintree, Mass.
Filed June 19, 1970, Ser. No. 47,709
Int. Cl. B05b *1/32*
U.S. Cl. 239—460 **8 Claims**



In a shower head having a hollow body, a spray-adjusting assembly including a water-conducting member and a flow-obstructing unit mounted for reciprocal movement within the body, and manually operable means for moving said assembly within said body, the provision of means for facilitating movement of said assembly relative to said hollow body.

3,617,003
REGULATING COAL SLURRY SETTLING RATES
Edgar C. Winegartner, Baytown, Tex., assignor to Esso Research and Engineering Company
Filed May 4, 1970, Ser. No. 34,233
Int. Cl. B02c *23/00*
U.S. Cl. 241—16 **6 Claims**

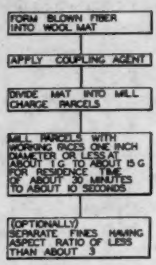


The sizes and specific gravities of coal solids in a slurry are limited on the basis of particle settling rates to prevent undesirable settling of the solids in a coal slurry handling system, especially in a liquefaction reactor for liquefying slurried coal solids. After makeup with crushed coal particles in a suitable liquid carrier, a coal slurry is charged in a continuous process to a settling rate separation zone, preferably embodied in a hydrocyclone, where the slurried coal solids are segregated according to whether they exceed a predetermined settling rate limit, one which preferably is within the range from about 0.5 to about 300 ft./min., coal solids settling faster than the limit rate being separated for constitution in an unfinished heavy slurry stream from the slurry particles which do not settle, at maximum settling velocity, in excess of the settling rate limit, such particles issuing in a finished slurry stream as product from the settling rate separation zone. The unfinished heavy slurry stream is passed to a comminution zone, preferably a ball mill, where the coal particles in the stream are milled to reduce their sizes, at least a portion of the particles being reduced to sizes, which for the specific gravities of such particles, will permit the particles to settle in the separation zone at a rate not greater than the predetermined limit. The comminuted heavy slurry stream is then mixed with new slurry feed and recycled to the settling rate separation zone where the comminuted coal particles and the new feed coal solids which do not settle at a maximum velocity in excess of the predetermined limit are constituted as finished slurry product, the particles exceeding the limiting rate being cycled to the comminution zone for further treatment.

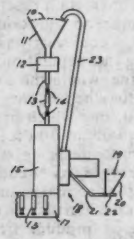
3,617,004
SILICEOUS FIBER FOR REINFORCEMENT AND METHOD OF ITS MANUFACTURE
James Ward Hyland, Jr., Maumee, and Roger Hill Bengtson, Whitehouse, both of Ohio, assignors to Johns-Manville Corporation, New York, N.Y.
Filed Mar. 27, 1970, Ser. No. 23,416
Int. Cl. B02c *15/00*
U.S. Cl. 241—15 **15 Claims**

A plastic reinforcement of siliceous fibers, preferably glass of 4 to 5 microns diameter and 80 to 150 microns length, coated with a coupling agent. Short length siliceous fibers for reinforcing plastics are produced from blown wool by treating the wool with a coupling agent and mechanically separat-

ing the fibers by milling. When incorporated in plastic matrices, the fibers provide physical characteristics corresponding to or superior to more expensive drawn siliceous fibers having the same aspect ratio.


FORM BLOWN FIBER INTO WOOL MAT
APPLY COUPLING AGENT
DIVIDE MAT INTO MILL CHARGE PARCELS
MILL PARCELS WITH WORKING FACES ONE INCH DIAMETER OR LESS AT ABOUT 1 G TO ABOUT 15 G FOR RESIDENCE TIME OF ABOUT 30 MINUTES TO ABOUT 10 SECONDS
(OPTIONALLY) SEPARATE FINES HAVING ASPECT RATIO OF LESS THAN ABOUT 3

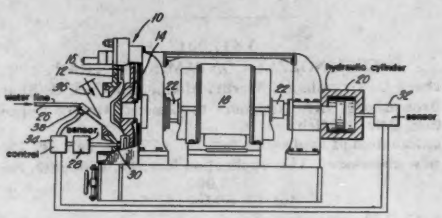
3,617,005
COMMINUTING METHOD OF AND MEANS FOR CONDITIONING THERMOPLASTIC MOLDING MATERIAL
William S. Pearson, Hampstead, Md., assignor to Cypro Incorporated, Hampstead, Md.
Filed Mar. 18, 1969, Ser. No. 808,250
Int. Cl. B02c *21/02, 18/44, 25/00*
U.S. Cl. 241—18 **8 Claims**



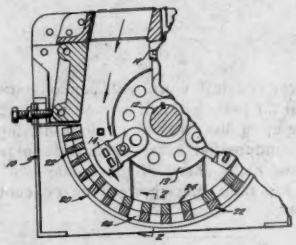
A method of an apparatus for conditioning thermoplastic material in the continuous making of articles in a machine to which the material is fed from a hopper in finely divided state and whereafter excess or scrap material trimmed from the articles and defective articles are comminuted for reuse in the machine. There is added to and commingling with the comminuted material finely divided virgin material to make up for the amount of plastic material remaining in the trimmed usable articles, and the mixture of material is delivered to said hopper.

3,617,006
REFINER CONTROL
Howard W. H. Jones, Grand'Mere, Quebec, Canada, assignor to Consolidated Paper (Bahamas) Limited, Nassau, Bahamas
Filed Apr. 28, 1970, Ser. No. 32,606
Int. Cl. B02c *7/00*
U.S. Cl. 241—21 **9 Claims**

A refining system wherein the consistency of the raw material fed and the energy applied to a refining zone defined by a pair of relatively rotating discs are regulated to ensure that steam generated between the discs develops a counterthrust tending to balance the pressure applied to the refining zone and wherein the steam pressure in the zone is sensed and the dilution water added controlled in accordance with this pressure sensed, thereby to maintain a balancing counterthrust between the discs, whereby effective disc separation may be maintained together with substantially uniform stock quality while avoiding plate clashing.

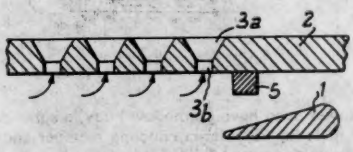


3,617,007
GRATE BAR ASSEMBLY FOR A ROCK CRUSHER
Joseph F. Bonarrigo, Jr., 2925 Manns Ave., Baltimore, Md.
Filed Oct. 3, 1969, Ser. No. 863,428
Int. Cl. B02c *13/13, 13/284*
U.S. Cl. 241—86 **3 Claims**



A rock or ore crusher is provided with a grate bar assembly through which falls comminuted material as it is triturated by the impact member moving within the crusher. Such grate bar assembly is fabricated of abrasive resistant metal and is relatively expensive. The grate assembly of the present invention is constructed of a lower grate section and an upper grate section which may be replaced when worn or abraded without the necessity of replacement of the lower grate section. Interlocking means secures the sections together.

3,617,008
REFINING APPARATUS, CHIEFLY FOR SCREENING PAPER PULP
Pierre Lamort, Vitry-le-Francois, France, assignor to Etablissements E & M Lamort Fils, Vitry-le-Francois, Marne, France
Filed July 25, 1968, Ser. No. 747,503
Claims priority, application France, Aug. 2, 1967, 116,590
Int. Cl. B02c *13/13, 13/14;* **B07b** *1/00*
U.S. Cl. 241—88 **9 Claims**



A perforated screen associated with the conventional blades the movement of which over the screen removes the impurities collecting on the perforations. To reduce the com-

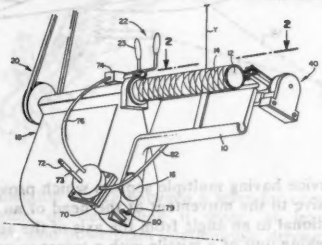
ponent of the speed of the fluid in parallel with the surface of the screen, hindrances constituted by parallel recesses or by parallel blades are provided in substantial parallelism with the blades across the screen surface facing the blades; said hindrances may be continuous or arranged in staggered formation.

3,617,009

YARN PACKAGE PRESSURE CONTROLLER FOR YARN WINDING APPARATUS

John B. Lawson, Barrington, R.I., and Stephen C. Dangel, Westwood, Mass., assignors to Robison Rayon Company, Inc., Providence, R.I.

Filed Sept. 2, 1969, Ser. No. 854,519
Int. Cl. B65h *54/00*
U.S. Cl. 242—18 R 7 Claims



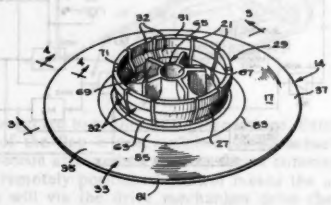
A closed-loop servosystem for a yarn winder to maintain a controlled preselected transverse force on the surface of the yarn package. The preselected force is maintained by a spring-loaded damped roller or button guide. The small perturbations in the position of this same roller or button guide are simultaneously used to control the pneumatic positioning of the roller with respect to the winding spindle during the package build.

3,617,010

SPOOL FOR ENDLESS TAPE CARTRIDGE

Don R. Coy, Palatine, Ill., assignor to Ampex Corporation, Redwood City, Calif.

Filed Jan. 15, 1970, Ser. No. 3,070
Int. Cl. B65h *17/48, 75/18*
U.S. Cl. 242—55.19 A 5 Claims



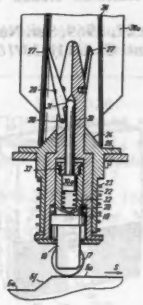
A molded plastic spool having a tape platform for an endless array of magnetic tape and a hub with an upper hub extension thereon is formed in one piece to replace presently used two-piece spools. The hub extension, which has a larger diameter than the diameter of the lower portion of the hub joined to the platform, is formed to allow inward deflection to permit stripping of the spool from a mold. Preferably, the hub extension is segmented to provide individual segments which are deflected radially inwardly during stripping and then allowed to return outwardly when free of the mold.

3,617,011

DEVICE FOR THE AUTOMATIC FASTENING OF SUPPLY YARN TUBES OF VARIOUS DIAMETERS AND FOR THEIR CHANGING IN TEXTILE MACHINES

Premysl Kostelecky, Liberec; Vladislav Hlavaty, Liberec; Jiri Havlas, Liberec, and Jaromir Rydlo, Vesec u Liberec, all of Czechoslovakia, assignors to Elitex, Zavody textilniho strojirenstri, Liberec, Czechoslovakia

Filed Jan. 23, 1970, Ser. No. 5,247
Claims priority, application Czechoslovakia, Feb. 13, 1969, 959/69
Int. Cl. B65h *49/02;* D03j *5/08*
U.S. Cl. 242—130 7 Claims



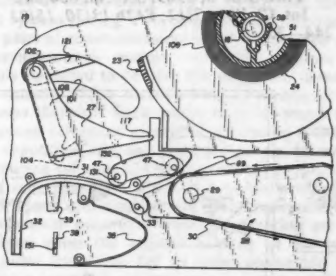
A device for the automatic fastening of yarn supply tubes of various diameters and their changing in textile machines, particularly in automatic high-speed winding machines; the device permits the fastening of tubes of various diameters, and the simple refilling of the supply of separate winding units either manually or from a central magazine. Tube-fastening mandrels, which are mounted symmetrically on a rotatable disc above a cam, are made such that a body with a cone at its free end is mounted for axial traverse. Said body has a fastening mechanism mounted in its upper part for centering and fastening the supply tubes, said mechanism being controlled by a pin mounted axially traversably in a sleeve and provided with a cam follower at its end, said follower being resiliently pressed against the cam and cooperating with both the sleeve and the fastening means.

3,617,012

INTERLOCK MECHANISM FOR CARTRIDGE-LOADING MOTION PICTURE PROJECTOR OR THE LIKE

Daniel J. Stark, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 31, 1970, Ser. No. 24,076
Int. Cl. G03b *1/04;* G11b *15/32*
U.S. Cl. 242—192 4 Claims



A cartridge-loading motion picture projector has a film supply spindle mounted on an arm that is movable to each of a plurality of positions wherein the spindle is engageable with a core of a film reel positioned within a cartridge on the projector, and the arm and spindle are movable to at least one

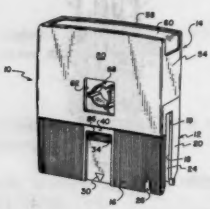
additional position wherein the spindle is adapted to support an unenclosed reel of film or the like. The projector comprises a film-feeding mechanism that is at least partially movable into each of several sizes of cartridges that may be mounted on the projector for engaging a roll of film within the cartridge and for feeding said film from the cartridge to automatic threading devices of the projector. An interlock mechanism is provided for blocking normal operation of the film-feeding mechanism when the spindle and arm supporting it are moved to the reel-supporting position.

3,617,013

CARTRIDGE

Dianne B. Ainslie, and Arthur H. Crapsey, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed June 27, 1969, Ser. No. 837,279
Int. Cl. G11b *23/10*
U.S. Cl. 242—197 **9 Claims**



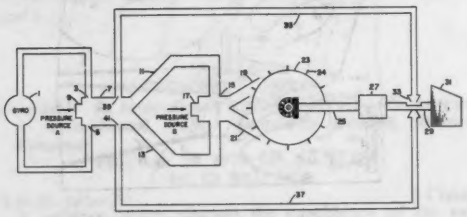
A cartridge has two separate parts with recesses therein jointly defining a chamber for a reel of film or other web material when the cartridge parts are assembled together. Cooperating latch structure on the cartridge parts includes at least one opening in a wide wall of one cartridge part which is adapted to receive a latch portion projecting from a wide wall of the other cartridge part. In assembling the cartridge the latch portion on the second cartridge part is deflected into the recess in the first cartridge part and then snaps into the latch opening in the first cartridge part. In a preferred embodiment of the invention two separate latch members project from a second wide wall of the second cartridge part and enter two spaced latch openings in a corresponding wide wall of the first cartridge part. Provision may be made for vertical stacking of horizontally positioned cartridges as well as for side-by-side positioning of the cartridges in adjacent vertical planes.

3,617,014

FLUIDIC VANE ACTUATION DEVICE

Carl H. Warren, New Hope, Ala., assignor to The United States of America as represented by the Secretary of the Army

Filed Sept. 3, 1969, Ser. No. 854,842
Int. Cl. F41g *7/12*; **F42b** *13/30, 15/02*
U.S. Cl. 244—3.1 **4 Claims**



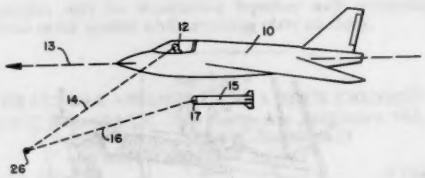
A fluidic control device for positioning missile directional vanes wherein an error signal from the missile gyro controls the output of a two-stage fluid amplifier. The output of the amplifier is used to drive a high-response power source which in turn rotates the directional vanes. A fluid feedback control is utilized in conjunction with the vanes for controlling the amplifier in response to the position of the vanes.

3,617,015

HEAD-COUPLED MISSILE-AIMING DEVICE

Floyd A. Kinder, China Lake, Calif., assignor to The United States of America as represented by the Secretary of the Navy

Filed Oct. 4, 1968, Ser. No. 765,117
Int. Cl. F41g *7/10, 9/00, 11/00*
U.S. Cl. 244—3.14 **1 Claim**



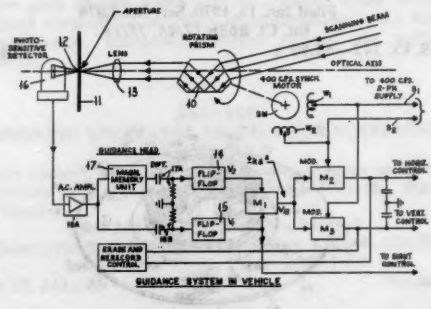
A device having multiple sensors which provide a voltage, responsive to the movement of the head of an aircraft pilot, proportional to an angle from the axis of the aircraft to align the tracking unit of a missile with a target to permit firing of the missile when the aircraft cannot be aligned with the target.

3,617,016

IMAGE MOTION AND CHANGE TRANSDUCERS AND SYSTEMS CONTROLLED THEREBY

Emil J. Bolsey, 160 Concord Ave., White Plains, N.Y.

Continuation-in-part of application Ser. No. 118,194, June 19, 1961, now abandoned. This application May 27, 1968, Ser. No. 778,870
Int. Cl. F41g *9/00*; **F42b** *15/02*; **F41g** *11/00*
U.S. Cl. 244—3.16 **24 Claims**

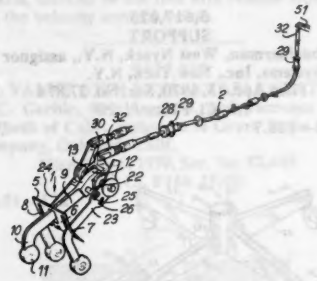


A system for generating signals indicative of changes in multiple scanned images. The same subject may be scanned at successive intervals or multiple subjects may be scanned simultaneously. In the former situation, signals representative of the scanned image are stored and then compared with signals from a subsequent scanning. Where simultaneous scanning of subjects occurs, signal comparison is immediate. In both cases, output signals are generated in response to changes in the scanned images, the signals being used for positional correction or data readout.

3,617,017
POWER-TRANSMITTING MECHANISMS, AND APPLICATIONS THEREOF, NOTABLY TO HELICOPTERS

Gerard Alain Lafortune, Marignane, and Rene Marcel Leonard, Clas-Cabries, both of France, assignors to Sud-Aviation Societe Nationale de Constructions Aeronautiques, Paris, Seine, France

Filed Oct. 7, 1969, Ser. No. 864,973
Claims priority, application France, Oct. 7, 1968, Oct. 8, 1968, 168,928; 169098
Int. Cl. B64c 27/04
U.S. Cl. 244—17.11 15 Claims

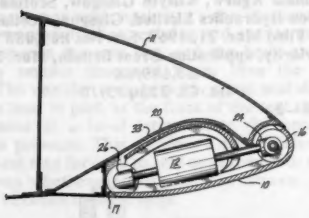


A cross-connection device between a lever for coupling a powerplant with, or decoupling it from, at least one helicopter rotor, said powerplant continuously driving ancillary generators, and at least one throttle lever associated to the powerplant, the cross-connection being effected mechanically by engagement between the powerplant coupling lever and the throttle lever, said powerplant coupling lever describing to that end a motion directed by a grid for guiding said levers.

3,617,018
FOLDING FLAP

Russell E. Baetke, Seattle, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Jan. 26, 1970, Ser. No. 5,685
Int. Cl. B64c 3/50, 9/26
U.S. Cl. 244—42 D 4 Claims



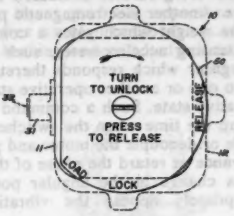
A flap connected to a wing by a geared hinge. Extension or retraction of the flap is accomplished by an actuating and drive mechanism arranged on the flap. Upon command of an associated remotely positioned control means the actuating mechanism will via the drive mechanism drive the geared hinge connection for moving the flap into a predetermined position in reference to the wing surface.

3,617,019
LOCKING DEVICE FOR PARACHUTE HARNESS QUICK RELEASE

Joseph E. Femia, 277 Fountain St., Framingham, Mass.

Filed Apr. 3, 1970, Ser. No. 25,486
Int. Cl. B64d 17/32
U.S. Cl. 244—151 4 Claims

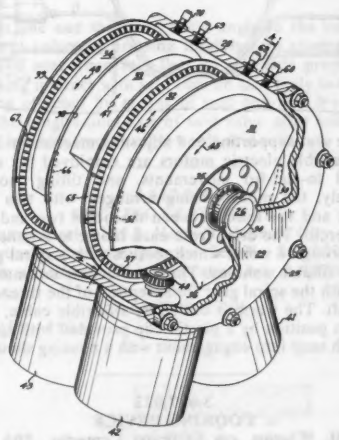
A locking device for a parachute harness quick release comprises a positive locking means which prevents premature retraction of pins which retain the parachute harness straps. The pins are simultaneously depressed by pressing a button to release a plurality of parachute straps from the pins after unlocking of the pins by the locking means.



3,617,020
VIBRATION CONTROL SYSTEM

Milton I. Gerstine, Ardentown, Del., and John E. Burkam, Media, Pa., assignors to The Boeing Company, Seattle, Wash.

Division of Ser. No. 695,251, Jan. 2, 1968, Pat. No. 3,509,971.
Filed Apr. 27, 1970, Ser. No. 43,271
Int. Cl. B64c 27/00
U.S. Cl. 244—17.27 16 Claims



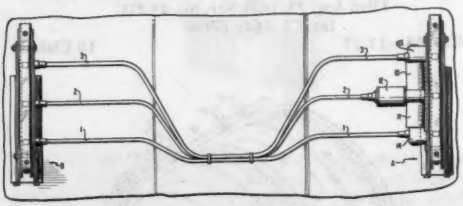
A vibration control system for balancing out fuselage vibrations in one or two directions in one plane, which vibrations are caused by the rotating wing of an aircraft; the vibration control system having a force-producing mechanism of at least two pairs of counterrotating weights driven by at least two AC asynchronous motors, with the motors being synchronously operated to revolve the weights at three times the angular velocity of the rotating wing by electronic motor control systems therefor. Each motor control system utilizes a common speed reference generator producing pulses having a given repetition rate and includes an electromagnetic pickoff for sensing the speed of the motor and producing pulses having a repetition rate which is a predetermined function of motor speed and equal to the given repetition rate of the speed reference generator when the weights are being rotated at three times the angular velocity of the rotating wing. Both pulse trains are fed to series-connected tunnel diodes forming a reversible register responsive to a difference in the number of the pulses received, the register having different operating potentials or states representative thereof for actuation of blocking oscillators when the register is in certain operative states. The oscillators then cause SCR switches to become actuated to couple the power supply to the motor for increasing the speed of the motor. When the register is in one of its inoperative states, the switches are not

in their actuated condition and the motor is decoupled from the power supply, which causes the speed of the motor to decrease, the speed being further decreased by use of an eddy current brake. Another electromagnetic pickoff senses the position of the weight which gates a command signal from a vibration-sensing accelerometer, such signal being supplied to the register which responds thereto by shifting the state thereof to one or another operative state or to one or another inoperative state. Such a command signal either delays or speeds up the time when the switches would normally either couple or decouple the motor and power supply so as to either advance or retard the phase of the motor and ultimately cause a change in the angular position of the weight to appropriately oppose the vibrations on the fuselage.

3,617,021
VEHICLE SEAT SUPPORTING AND ADJUSTING MECHANISM

Joseph C. Littmann, Temperance, Mich., assignor to Dura Corporation, Toledo, Ohio

Filed Aug. 11, 1969, Ser. No. 849,024
Int. Cl. B60n *1/02*
U.S. Cl. 248—393 **1 Claim**



Vehicle seat supporting and adjusting mechanism in which three reversible electric motors are employed for effecting horizontal to-and-fro movements, and tilting movements respectively, the motors being arranged with two in axial alignment and the third between the other two and at right angles thereto. The drive from each motor to a helical screw shaft is through a worm which meshes with a spiral gear carried by a tiltable annulus. The annulus has internal threads coaxial with the spiral gear for reception of the threads of the screw shaft. The worm is driven by a flexible cable, which is secured in position by a plastic clip provided with spring fingers which snap into engagement with a housing shoulder.

3,617,022
COOKING DEVICE

William H. Wiggins, c/o Embryon Company, 50A Soudan Avenue, Toronto 7, Ontario, Canada

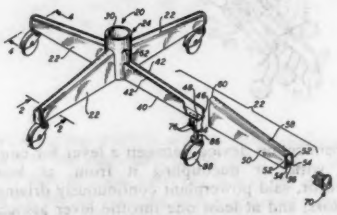
Filed Apr. 21, 1969, Ser. No. 817,864
Claims priority, application Canada, Mar. 25, 1969, 046,627
Int. Cl. F16m *13/00*
U.S. Cl. 248—158 **3 Claims**

A cooking device comprising upper and lower hemispheres wherein the peripheral rim of the lower hemisphere is tilted at an angle to the axis of a pedestal support to which it is rigidly secured. The upper hemisphere is rotatably mounted on the lower hemisphere so as to rotate about a common axis of each, and is dimensioned so as to rotate without interference over at least a portion of the outer surface of the lower hemisphere. Stop means are provided to preclude rotation of the upper hemisphere in the other direction over the lower hemisphere so that the upper hemisphere forms a hood for the lower hemisphere. Pedestal means are provided comprising a tension-compression structure wherein a tube having flared ends is subjected to compression forces by tightening a threaded tension rod within the tube.

3,617,023
SUPPORT

Alvin R. Schneiderman, West Nyack, N.Y., assignor to Litton Business Systems, Inc., New York, N.Y.

Filed Apr. 13, 1970, Ser. No. 27,874
Int. Cl. F16m *11/20*
U.S. Cl. 248—188.7 **38 Claims**

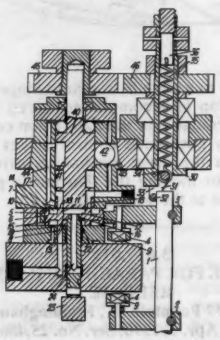


A pedestal is formed by providing a centrally disposed hub with a plurality of radially extending members of channel configuration opening upwardly. A sleeve of leglike configuration is slid onto each channel member until a lip formed at one end of the sleeve seats in a notch formed in the hub. A plug is then set into the open end of the sleeve and channel member. The plug and sleeve may be positioned by insertion of the pintle portion of a caster or glide through a hole formed in the bottom of the channel member and the journaling of said pintle in an aperture appropriately formed in the plug, or by screws or both.

3,617,024
COPY MILLING DEVICE

Patrick William Agnew, Kilsyth Glasgow, Scotland, assignor to Precision Hydraulics Limited, Glasgow, Scotland

Filed Mar. 21, 1969, Ser. No. 809,083
Claims priority, application Great Britain, Mar. 21, 1968, 13,689/68
Int. Cl. B23q *35/16*
U.S. Cl. 251—3 **14 Claims**



Apparatus for tracing the contour of a shaped member including a platform adapted to mount a shaped member and a

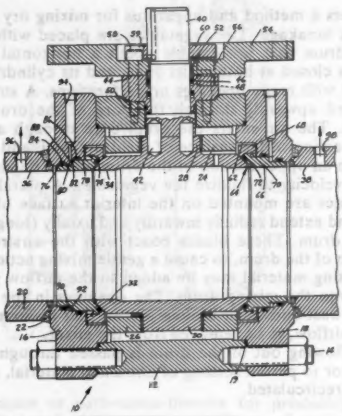
feeler mounted on a carrying head and adapted to engage the shaped member, means tending to maintain the feeler in engagement with the shaped member, and servomotor devices coupled to the platform for movement of the platform respectively in directions at right angles to each other to trace the contour of said shaped member, the velocity of said devices being controlled by velocity control means, for example, valves or other movement-sensing means actuated by the aforesaid movement of said feeler and the feeler being rigidly mounted on a first arm which, in turn, is pivotally mounted intermediate its ends on a second arm for movement about an axis parallel to the longitudinal axis of the feeler, the second arm being pivotally mounted on the carrying head for movement about a second axis parallel to and spaced from the first axis, the end of the first arm remote from the feeler actuating the velocity control means.

3,617,025

BALL VALVE WITH RETRACTABLE SEAT RINGS

Charles C. Gerbic, San Anselmo, and Terrence V. Molloy, Pinole, both of Calif., assignors to Grove Valve and Regulator Company, Oakland, Calif.

Filed July 6, 1970, Ser. No. 52,445
Int. Cl. F16k *25/00*
U.S. Cl. 251—172 **8 Claims**



A valve seat ring seals against a valve closure on a main sealing diameter. A trailing seal ring and an intermediate seal ring seal between the seat ring and the body on diameters respectively smaller than and larger than the main seal diameter. The annular area between these seal diameters is opposed, at least in part, at the front of the seat ring by body space pressure at a level intermediate the upstream and downstream pressure. This provides a force differential that biases the seat ring forward to seal or rearward to retract, depending upon whether upstream or downstream pressure is introduced between the seal rings.

3,617,026

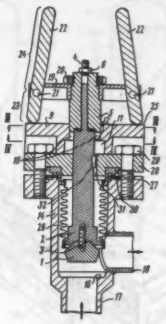
VALVE FOR VACUUM INSTALLATION

Georgy Filippovich Polyakov, ulitsa Akademicheskaya, 23, kv. 8; Boris Nikolaevich Petrov, ulitsa Ilicha, 11, kv. 29; Vladimir Lvovich Vanin, ulitsa Gogolya, 31, kv. 35, and Vladimir Alexandrovich Kamardin, ulitsa Dachnaya, 25, kv. 71, all of Novosibirsk, U.S.S.R.

Filed Dec. 23, 1969, Ser. No. 887,647
Claims priority, application U.S.S.R., Feb. 20, 1969, 1300959
Int. Cl. F16k *31/00, 31/524*
U.S. Cl. 251—296 **3 Claims**

The invention relates to valves for vacuum installations wherein the closing element is connected with the movable part of the drive which can be fixed in the "open" and "closed" positions and can move freely between these positions.

The claimed drive comprises a bushing having side projections and installed with their aid in linear guides of the valve body for moving in them without turning towards a seat 16 and away from it with the aid of at least one two-arm lever connected with said bushing and bearing with one end against the body of said valve when the latter is opened. The length of the linear guides is approximately equal to the length of the free travel of said bushing, and the side projections of said bushing and said body of said valve have flats



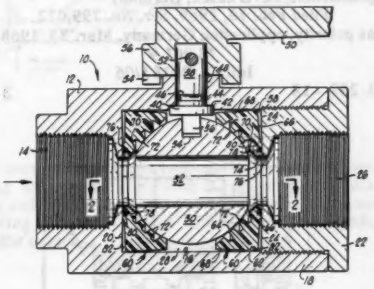
slanted at one and the same acute angle to the longitudinal axis of said valve for pressing forcibly said closing element against said seat when said flats on said side projections of said bushing interact with said flats on said body said interaction being effected by means of said two-arm lever turned around the longitudinal axis of said valve after said bushing has completed its free travel towards said seat.

3,617,027

ROCKING SEAT VALVE

Domer Scaramucci, 3245 S. Hattie, Oklahoma City, Okla.

Continuation-in-part of application Ser. No. 587,002, Oct. 17, 1966, now abandoned. This application July 1, 1970, Ser. No. 51,630
Int. Cl. F16k *27/06*
U.S. Cl. 251—315 **6 Claims**



A ball valve having upstream and downstream seats sealed to the body at the inner peripheries of the seats. The seats twist or rock upon upstream and downstream movements of the ball. The upstream seat is forced away from the ball upon closing of the valve to prevent damage to the seat by the nose of the ball, and the outer peripheral portion of the seat is out of the path of the nose of the ball on opening of the valve. Various designs of seating surfaces for the seats are disclosed.

3,617,028

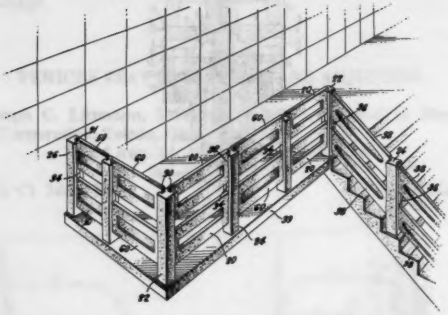
PRECAST REINFORCED CONCRETE POST AND RAIL ASSEMBLY

David Bach, 2601 N.E. 55th Court; Walter Rothman, 2801 N.E. 51st St., Fort Lauderdale, Fla., and Carlos Manuel Pascual, 571 N.W. 49th Ave., Plantation, Fla.

Continuation-in-part of application Ser. No. 807,043, Mar. 13, 1969, now Patent No. 3,554,495, dated Jan. 12, 1971. This application Apr. 28, 1970, Ser. No. 32,554

Int. Cl. E04h *17/16*

U.S. Cl. 256—19 7 Claims



A precast reinforced concrete post and railing assembly of panels for balconies, walkways and stairways, the posts having vertical grooves to hold the panels between them after the panels have been slid into place when the posts have been erected on the flat surfaces. The panels are inserted in pairs which may abut each other or concrete spacers may be used to provide vertical spacing between panels supported by the same pair of posts.

3,617,029

PROCESS AND APPARATUS FOR THE PRODUCTION OF FOAM PLASTICS MATERIALS IN PARTICULAR POLYURETHANE FOAMS

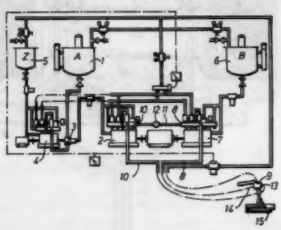
Karl Breer, Koeln-Flittard, and Claus Nadolski, Leverkusen, both of Germany, assignors to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Feb. 13, 1969, Ser. No. 799,022

Claims priority, application Germany, Mar. 23, 1968, P 17 78 061.9

Int. Cl. B01f *5/06*

U.S. Cl. 259—18 3 Claims



In the production of foam plastic, changes in the specific volume of the materials mixed together for the reaction which forms the foam, may adversely affect the quality of the product. To compensate for such changes, the feed conduits conveying the materials to the mixing chamber are interconnected by a conduit in which a distensible member sealing the feed conduits from each other, is mounted.

3,617,030

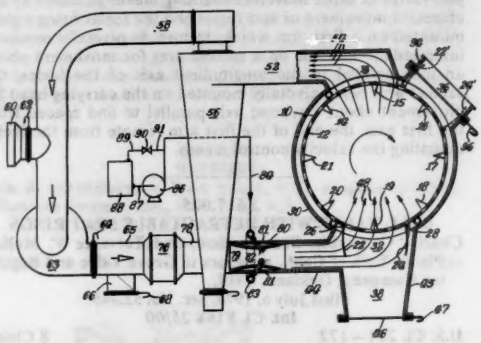
MIXING EQUIPMENT FOR DRY VEGETABLES

Pelopida Tironi, Legnago, Italy, assignor to CPC International Inc., Englewood Cliffs, N.J.

Filed July 15, 1969, Ser. No. 842,834

Int. Cl. B01f *9/00*

U.S. Cl. 259—81 R 7 Claims



Covers a method and apparatus for mixing dry vegetables without breakage. The vegetables are placed within a cylindrical drum that is rotatable about a horizontal axis. This drum is closed at both of its ends, and its cylindrical wall is formed with many openings or perforations. A stream of air is passed upwardly through the bore of the drum, as it is rotated. The air enters the drum bore through an exposed lower section of the surface of the drum wall, and discharges through an upper section of the drum wall. The air has a sufficient velocity to fluidize the vegetables. A plurality of mixing blades are mounted on the interior surface of the drum wall, and extend radially inwardly and axially (longitudinally) of the drum. These blades coact with the airstream, upon rotation of the drum, to cause a gentle mixing action.

Treating material may be added to the airflow prior to its entry into the mixing drum. The openings in the drum wall permit dust and small broken pieces, that become entrained in the airflow, to be removed from the mixer.

Air flowing out of the drum is passed through a cyclone separator to permit settling of entrained material, and the air is then recirculated.

3,617,031

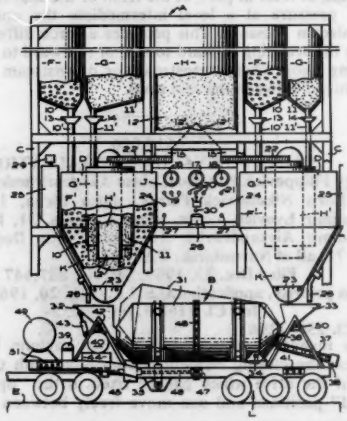
CONCRETE BATCHOR PLANT AND DOUBLE-END LOADING TRANSIT MIXER

Hugh P. Paris, 3101 Middlefield Road, Palo Alto, Calif.

Filed July 10, 1970, Ser. No. 53,943

Int. Cl. B28c *7/04*

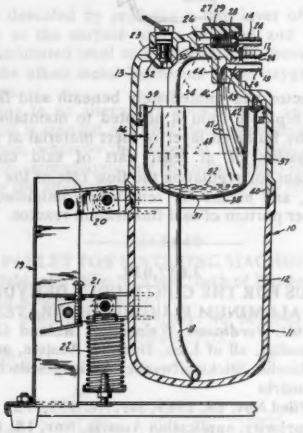
U.S. Cl. 259—165 5 Claims



A concrete batchor plant and double-end loading transit mixer wherein a pair of containers for concrete components

are supported in spaced longitudinal relation with respect to one another so that a transit mixer may be driven into a loading position beneath the containers. A plurality of hoppers are provided for separate storage of gravel, sand and cement, and weighted amounts of these components are delivered to the containers. Moreover, a transit mixer has a rotatable drum with chutes disposed at its front and rear ends for conveying charges of the gravel, sand and cement to the interior of the drum, whereby the charges may be delivered simultaneously into both ends of the drum.

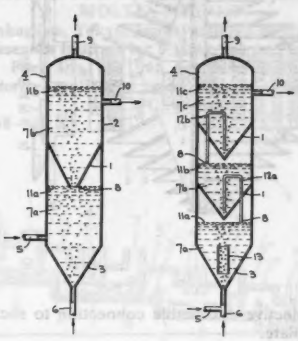
3,617,032
CARBONATOR AND METHOD OF CARBONATION
Gene A. Tracy, Hugo, Minn., assignor to The Cornelius Company
Filed Sept. 3, 1968, Ser. No. 756,959
Int. Cl. B01f *3/04*
U.S. Cl. 261—18 R **8 Claims**



A carbonator or carbonator-blender for producing and storing carbonated water or an admixture of carbonated water and syrup. An open-top bowl is disposed within a cylindrical CO_2-pressurized chamber formed within a pressure tank. A nozzle is provided within the chamber for directing a conical stream of pressurized water into the bowl and another nozzle directs a stream of syrup against the side of the water stream. The bowl is provided with an abutment to produce a swirling action of the water and syrup therewithin and an aperture is formed in the bottom of the bowl for draining the admixture of water and syrup into the lower portion of the chamber.

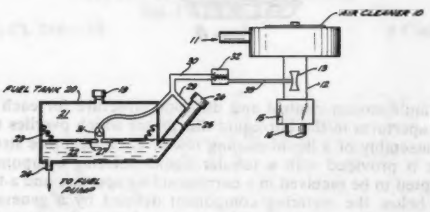
3,617,033
APPARATUS FOR CONTINUOUS GAS-LIQUID CONTACT
Yataro Ichikawa; Michiyuki Tokashiki, and Tadashi Ono, all of Iwakuni-shi, Japan, assignors to Teijin Limited, Osaka, Japan
Filed Nov. 1, 1968, Ser. No. 772,733
Int. Cl. B01f *3/04*; B01j *1/00*; C07c *51/42*
U.S. Cl. 261—21 **13 Claims**

A gas-liquid contacting apparatus including a vertical vessel divided in the vertical direction into at least two sections by at least one tapered partition wall; each of the sections is constructed such that the material contained in one section may be conducted successively to the bottom or lower portion of the other section by an opening provided at the bottom of the partition wall or by a conduit which extends through two sections and has an end downstream of a fluid which opens into the lower portion of the other section; the first section comprises a supply pipe for supplying liquid or suspension and a pipe for feeding a desired gas into the lower part of the section: and the last section includes at least one exhaust opening for withdrawing the treated liquid or suspension and gas. The apparatus is particularly useful for refining



of crude terephthalic acid by contacting a suspension thereof with molecular oxygen.

3,617,034
INTERNAL COMBUSTION ENGINE FUEL SYSTEM MINIMIZING EVAPORATIVE FUEL LOSSES
Davis A. Skinner, Fullerton, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.
Filed Feb. 25, 1970, Ser. No. 14,103
Int. Cl. B65d *25/38*
U.S. Cl. 261—22 **6 Claims**

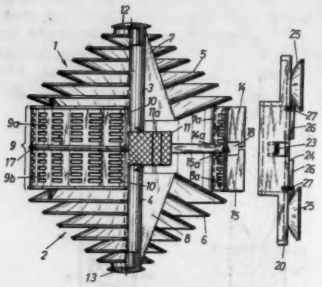


Fuel losses and accompanying air pollution are lessened by equipping an internal combustion engine with a fuel tank having a collapsible liquid fuel compartment and means for withdrawing any fuel vapors which form and combusting them in the engine.

3,617,035
EVAPORATION APPARATUS FOR IMPROVING THE AIR
Kurt Albert Hoeher, Schwarzach, Austria, assignor to Noli Aktiengesellschaft, Glarus, Switzerland
Filed Dec. 11, 1969, Ser. No. 884,062
Claims priority, application Germany, Apr. 1, 1969, P 19 16 649.5
Int. Cl. B01f *3/04*
U.S. Cl. 261—99 **4 Claims**

An evaporation apparatus for improving the air in industrial plants, restrooms, and the like, which includes a felt plate containing liquid to be evaporated and also comprises two groups of conical guiding fins on opposite sides of said felt plate while a two-sectional holding ring having its sections

respectively firmly connected to said two groups and detachably connected to each other is provided with prong

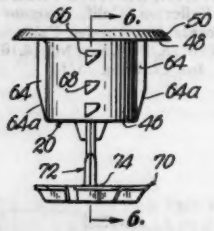


means for selective detachable connection to socket means in a holding plate.

3,617,036
NOZZLE

Thomas L. Brown, Mission, Kans., assignor to The Marley Company, Kansas City, Mo.

Filed Aug. 1, 1969, Ser. No. 846,757
Int. Cl. B01f *3/04*
U.S. Cl. 261—111 **13 Claims**



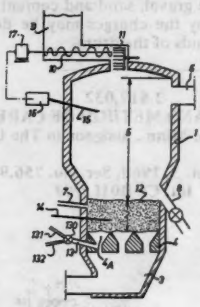
Liquid-stream control and diffusion structure for each of the apertures in the hot-liquid distributor which overlies the fill assembly of a liquid-cooling tower. Each structure structure is provided with a tubular liquid-metering component adapted to be received in a corresponding aperture and a target below the metering component defined by a generally planar section provided with a series of slots therein partitioning the section into a series of outwardly projecting, individual segments located to divide the stream of hot liquid gravitating onto the target section from the metering component thereabove into an umbrella-shaped liquid pattern with spoke defining interior liquid sheets to thereby break up the column of water discharged from the metering component and assure relatively uniform distribution of the liquid over the plan area of the fill assembly therebelow served by that control and diffusion structure.

3,617,037
HEAT TREATMENT OF SLUDGES

Pierre Foch, Forbach, France, assignor to Charbonnages De France, Paris, France

Division of Ser. No. 557,414, June 14, 1966, Pat. No. 3,315,381.
Filed July 2, 1969, Ser. No. 853,580
Int. Cl. F27b *15/00*
U.S. Cl. 263—21 **2 Claims**

Apparatus for the heat treatment of partially combustible products in the form of a liquid or pasty sludge including a fluidization reactor having a lower fluidization zone and an upper treatment zone, a distributor grid below the fluidization zone, means for introducing an oxidizing fluidizing agent beneath said distributor grid at a constant flow rate and through said distributor grid to said fluidization zone, means for feeding said combustible products to be treated into the upper portion of said treatment zone from the top, means for introducing into said fluidization zone an inert material of larger granular size than the size of said combustible products, means for introducing a separate fluid over said

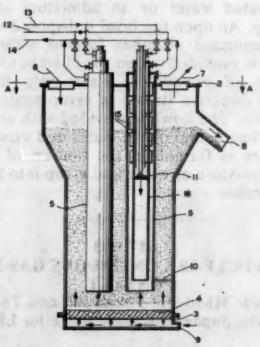


fluidizing reactor and immediately beneath said fluidization zone, which separate fluid is adapted to maintain the temperature of the fluidized layer of inert material at a valve to insure calcination of at least part of said combustible products, means for regulating the flow rate of the combustible products, and means for removing combusted material from the upper portion of said fluidization reactor.

3,617,038
APPARATUS FOR THE CONTINUOUS DEHYDRATION OF ALUMINUM FLUORIDE HYDRATES

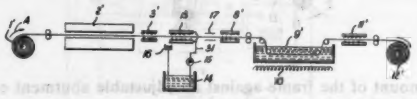
Alfred Schmidt; Ferdinand Weinrotter; Roland Glotzl, and Rudolf Staudigl, all of Linz, Danube, Austria, assignors to Oesterreichische Stickstoffwerke Aktiengesellschaft, Linz, Danube, Austria

Filed Nov. 18, 1969, Ser. No. 877,772
Claims priority, application Austria, Nov. 18, 1968, 11,173/68
Int. Cl. F27b *15/00*
U.S. Cl. 263—21 A **6 Claims**



Apparatus for the continuous dehydration of aluminum fluoride hydrates consisting of a fluidized-bed furnace with a cylindrical furnace jacket and a perforated plate just above the base, a lid to which gas-heated jacket radiant tubes are fixed reaching vertically almost to the said plate each of the tubes being closed at one end and having a concentric inner tube with a burner in the interior and being of almost the same length as the jacket radiant tube as well as open at the bottom so that combustion gas issuing from said burner in the interior of said inner tube flows upward in the tip of the outer tube after a change of direction of 180°. Thus both the fluidized bed outside the jacket radiant tube and, via a recuperator, the air passed to the burner are warmed.

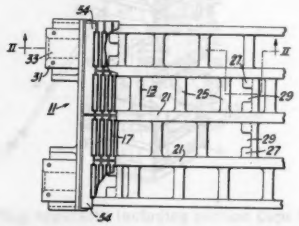
3,617,039
DESCALING APPARATUS FOR STEEL
Saburo Fukui, Hiroshima; Tsunehiro Yamazaki, Hiroshima; Masato Yamamoto, Asa-gun; Masuichi Miyake, Saeki-gun, and Masanori Okumoto, Hiroshima, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan
Continuation-in-part of application Ser. No. 818,110, Apr. 21, 1969, now abandoned. This application July 3, 1969, Ser. No. 838,904
Claims priority, application Japan, Apr. 26, 1968, Aug. 17, 1968, 43/28067; 43/58798
Int. Cl. C21d 9/62
U.S. Cl. 266—3 R 3 Claims



Steel is descaled by applying a thin layer of alkali metal hydroxide to the surface to be descaled and subsequently heating the coated steel to a temperature above the melting point of the alkali metal hydroxide in an oxygen-containing atmosphere.

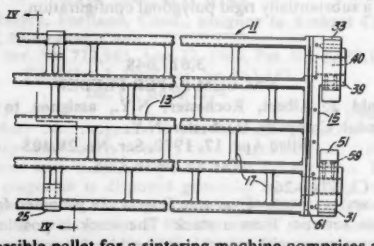
According to an alternative embodiment, an alkali metal salt solution is sprayed onto hot steel emanating from an annealing zone, whereby the water of the solution evaporates substantially immediately and the alkali metal salt melts. Apparatus for the alternative embodiment is also disclosed.

3,617,040
PALLET FOR SINTERING MACHINES
Kurt Reinfeld, and Dilip N. Assar, both of Pittsburgh, Pa., assignors to Koppers Company
Filed Oct. 1, 1969, Ser. No. 862,883
Int. Cl. B60g 11/22
U.S. Cl. 266—21 5 Claims



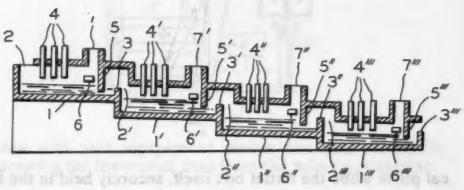
A sintering machine pallet assembly includes a main pallet frame and one or more intermediate sectional frames interposed between the main pallet frame and conventional grate bars.

3,617,041
REVERSIBLE SINTERING PALLET
Kurt Reinfeld, and Leo Silverblatt, both of Pittsburgh, Pa., assignors to Koppers Company, Inc.
Filed Oct. 1, 1969, Ser. No. 862,884
Int. Cl. B60g 11/22
U.S. Cl. 266—21 4 Claims



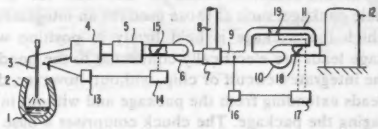
A reversible pallet for a sintering machine comprises a unitary structure that has fittings on the ends for mounting shafts with wheels, and that has detachable walls of a tooth pocket that cooperate with the teeth of a pallet-driving sprocket.

3,617,042
APPARATUS FOR CONTINUOUS REFINING OF MOLTEN METALS
Ryuichi Nakagawa, Tokyo, Japan, assignor to Director of National Research Institute for Metals, Tokyo, Japan
Filed Aug. 12, 1968, Ser. No. 752,015
Claims priority, application Japan, Aug. 14, 1967, 42/51777
Int. Cl. C21c 7/00
U.S. Cl. 266—34 R 6 Claims



Apparatus for refining metals comprising two or more trough type furnaces. Each furnace includes a blowing zone having lances for feeding oxygen and slag forming materials and a flow zone wherein metal and slag flow concurrently or countercurrently. Pig iron is refined continuously by passing it through the furnaces. Residence time in each furnace is 1 to 15 minutes. CaO added to the first blowing zone is one-sixtieth to one-fifteenth of the metal. Temperatures of the metal leaving the first and second furnaces are controlled to below 1,550° C. and within 1,550° to 1,700° C. respectively.

3,617,043
GAS RECOVERY SYSTEM FOR OXYGEN BLAST CONVERTERS
Motoaki Hirao, Hyogo, Japan, assignor to Kawasaki Jukogyo Kabushiki Kaisha, Hyogo, Japan
Filed Feb. 27, 1970, Ser. No. 14,906
Int. Cl. C21c 5/42
U.S. Cl. 266—35 5 Claims

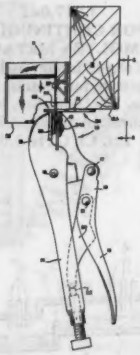


A feedback pipe is connected to the outlet and inlet sides of a storage blower directing unburned gas from an oxygen blast converter to a storage tank. Alternatively, the unburned gas is discharged to the atmosphere. Control valves moving in contrary directions are coupled to a single controller for maintaining the pressure in the storage delivery pipe constant regardless of whether unburned gas is discharged to the atmosphere or directed to the storage tank.

3,617,044
ELECTRICAL OUTLET BOX INSTALLATION TOOL
Edward A. Strange, Florence, Oreg., assignor to Frank V. Suniga, Oakridge, Oreg., a part interest
Filed Sept. 25, 1969, Ser. No. 860,891
Int. Cl. B25b 1/00
U.S. Cl. 269—6 1 Claim

A handtool with opposed movable jaws adapted to grip an electrical outlet box and position same in forwardly offset relationship to a wall stud for subsequent attachment thereto. A plate member carried by one of the jaws carries an adjustable guide bar to position the outlet box on the tool to accomplish the desired forward offset from the wall stud. The offset

distance is to accommodate the thickness of wallboard to be applied to the wall stud. A portion of the plate member abuts the front surface of the wall stud for positioning in one vertical plane while the outlet box itself, securely held in the tool, abuts a side surface of the wall stud during attachment of the box to the stud.

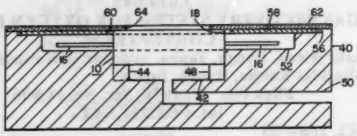


3,617,045

VACUUM-ACTUATED CHUCK

Harry Da Costa, Scottsdale, and Charles G. Thornton, Phoenix, both of Ariz., assignors to Motorola, Inc., Franklin Park, Ill.

Filed Jan. 14, 1970, Ser. No. 2,881
Int. Cl. B25b *11/00*
U.S. Cl. 269—21 **4 Claims**



A vacuum-actuated chuck is disclosed for a delicate ceramic package, such as those used for an integrated circuit, in which the package is held firmly in position while the package leads are electrically connected to the bonding pads on the integrated circuit or chip, without, however, distorting the leads extending from the package and without injuring or damaging the package. The chuck comprises a base member having a cavity including support pads for positioning the package and a space for receiving the package leads as well as an additional space for holding a support plate in position. A resilient mat which is impervious to air and which has a hole through the middle portion thereof, fits over the plate and the edge portions of the base member and the edge portions of the package. The hole in the mat exposes the inner ends of the package leads and the bonding pads on the chip so that work may be done thereon.

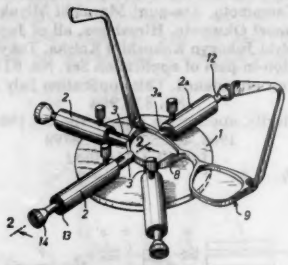
3,617,046

DEVICE FOR THE GRIPPING OF AN EYEGLASS FRAME, IN PARTICULAR IN DEVICES FOR MAKING LENS TEMPLATES

Thomas Sotonyi, Wuppertall-Barmen, Germany, assignor to Firma Wenicke & Co., Dusseldorf-Eller, Germany

Filed Aug. 19, 1969, Ser. No. 851,255
Claims priority, application Germany, Aug. 21, 1968, P 17 97 139.0
Int. Cl. B25b *5/14*
U.S. Cl. 269—156 **10 Claims**

This invention relates to a device for the gripping of an eyeglass frame, in particular in devices for making lens templates, comprising a ram plunger or the like pressing one lens



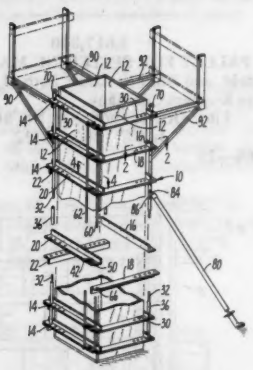
amount of the frame against an adjustable abutment edge or against two counterholders.

3,617,047

CONCRETE COLUMN FORM CLAMP AND METHOD

Jack A. Holt, San Bruno, and John D. Kay, Menlo Park, both of Calif., assignors to Burke Concrete Accessories, Inc., Burlingame, Calif.

Filed June 8, 1970, Ser. No. 44,412
Int. Cl. B23q *3/18*; **B25b** *5/14, 7/10*
U.S. Cl. 269—121 **12 Claims**



A concrete column form clamp and method. The clamp includes a plurality of frame members adapted to have form panels secured thereto, each of said frame members comprising a plurality of frame sections, and a plurality of elongated rod members, each of said rod members having hingedly mounted thereon adjacent frame sections of each of said frame members and extending between all of said frame members whereby corresponding sections of said frame members are ganged for articulated movement and said form clamp may be handled as a unit. The form clamp includes spacer means for maintaining adjacent frame members in spaced relationship to one another. Locking means is provided whereby the frame members may be selectively locked into a substantially rigid polygonal configuration.

3,617,048

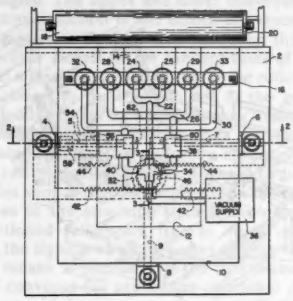
VACUUM PAPER FEEDER

Donald J. Albert, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 17, 1970, Ser. No. 29,403
Int. Cl. B65h *3/08*
U.S. Cl. 271—26 **8 Claims**

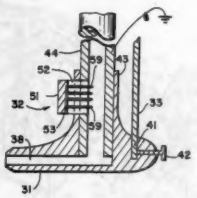
A series of sets of vacuum fingers are provided for feeding sheets seriatim from a stack. The stack is positioned on a paper support with movable side guides for positioning sheets of one of several preselected widths to be picked up by the

vacuum fingers. Solenoid valves interconnect the vacuum fingers with a source of vacuum and are operated in response to



the position of the side guides so that only those sets of fingers which are operative to engage sheets of the width of the paper on the support have a vacuum applied thereto.

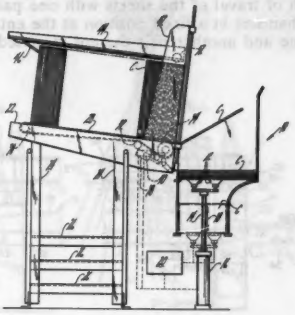
3,617,049
SHEET FEEDING APPARATUS
Anthony Q. Testone, Lansdale, Pa., assignor to Testone Electrostatics Corporation, West Point, Pa.
Filed Oct. 14, 1969, Ser. No. 866,206
Int. Cl. B65h *3/03, 3/18*
U.S. Cl. 271—26 **6 Claims**



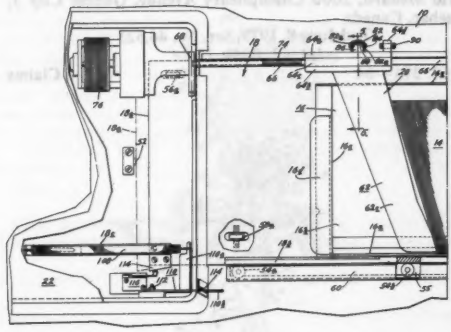
Sheet-feeding apparatus including suction cups for lifting a portion of a top sheet of a stack, and moving it laterally, and a presser foot for pressing on the remaining stack, and for blowing ionized air into the space between the top sheet and the next sheet. The presser foot has air passages through it, and an ion generator including concentric arcuate elements of insulating material with a conductive foil between them, and ionizing points extending into the presser foot from the foil.

3,617,050
MAGAZINE CONSTRUCTION FOR PACKING CASE ERECTING MACHINE
Daniel McIntyre, Portland, Conn., assignor to Emhart Corporation, Bloomfield, Conn.
Division of Ser. No. 722,943, Apr. 22, 1968, Pat. No. 3,580,143.
Filed Oct. 2, 1969, Ser. No. 863,147
Int. Cl. B65h *3/24*
U.S. Cl. 271—43 A **4 Claims**

A secondary case magazine is provided above and to one side of an upwardly open primary case magazine from which the lowermost case is cyclically withdrawn for erection. The secondary magazine is disposed generally horizontally, and holds a large number of cases in generally vertical edgewise relation. Escapement means at the exit end of the secondary magazine successively ejects each case for downward movement onto the stack of cases in the primary magazine. Means in the secondary magazine urges all of the cases therein toward said exit end, and said means operates in timed relationship with said escapement means and said means for withdrawing the lowermost case from the primary magazine.



3,617,051
CARD- AND PAPER-HANDLING APPARATUS
George P. McInerny, Cornwell Heights, Pa., assignor to Optical Scanning Corporation, Newtown, Pa.
Filed Apr. 24, 1969, Ser. No. 818,993
Int. Cl. B65h *1/24*
U.S. Cl. 271—62 B **8 Claims**

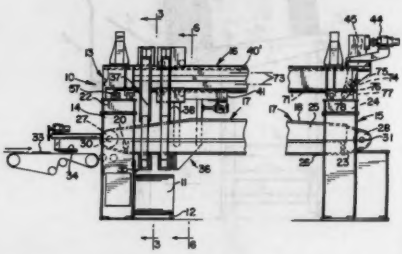


A card feed mechanism employs a carriage on which is supported a tray from which may be picked off one-by-one from a stack by pickoff means at one end of the tray. The carriage itself is urged with constant force by spring means toward the pickoff means. Feed means movably supported on the carriage moves toward the pickoff means to hold pressure on the stack at all times as the stack grows smaller. As this feed means moves forward the spring means allows the carriage to move backward to keep the pressure constant at the pickoff means. When the carriage reaches a certain position on the frame a switch in the circuit of the motor driving the feed means is opened until the carriage, under the urging of the spring moves forward again to a predetermined position.

3,617,052
SHEET PILER HAVING MOVABLE SIDE GUIDES
Dario Buccicone, Gary, Ind., assignor to Bucciconi Engineering Co., Inc., Gary, Ind.
Filed Oct. 2, 1969, Ser. No. 863,297
Int. Cl. B65h *29/30*
U.S. Cl. 271—63 A **15 Claims**

A machine for piling metal sheets which comprises an overhead conveyor for advancing sheets for deposit on a lift,

or the like, at a piling area, end stop and backstop mechanisms and side edge guide mechanisms, for cooperation with the end stop and backstop mechanisms, which side guide mechanisms are arranged in pairs, adjustable laterally of the path of travel of the sheets with one pair of the side guide mechanisms in a fixed position at the entrance end of the machine and another pair thereof mounted for longitudinal adjustment with the end stop mechanism. The side guide members are reciprocated as the sheets are dropped, so as to facilitate the piling of sheets delivered off center, and each of said members is suspended on a linkage system to prevent damage in the event the lift is raised sufficiently to strike the guide member, with the assemblies being strengthened and held against undue deflection by means of a special chain arrangement.



3,617,053
COPY-RECEIVING TRAY

Wilfrid Menard, 2660 Champfleury Avenue, Quebec City 3, Quebec, Canada

Filed June 8, 1970, Ser. No. 44,523
Int. Cl. B65h *31/24*
U.S. Cl. 271—64 **6 Claims**

An attachment to a copying machine separates issuing copies from processed original sheets and ensures that both copies and originals are in the same order and the correct way up even though on issuing from the machine outlets, the copy sheets are back to front.

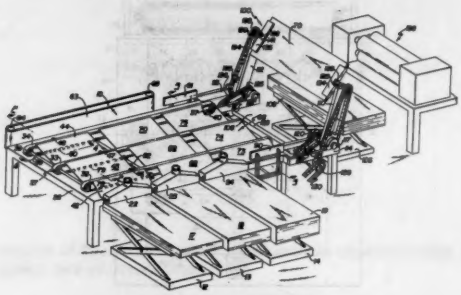
This is done by allowing the originals to fall in the order in which they issue but deflecting the copies through an angle greater than a right angle as they fall and then collecting them; the result is to return the front to the front.

3,617,054
SHEET DELIVERY APPARATUS

Water W. Schilling, Ladner, British Columbia, Canada, assignor to MacMillan Bloedel Limited, Vancouver, British Columbia, Canada

Filed Mar. 21, 1969, Ser. No. 809,295
Int. Cl. B65h *29/32, 29/40*
U.S. Cl. 271—69 **7 Claims**

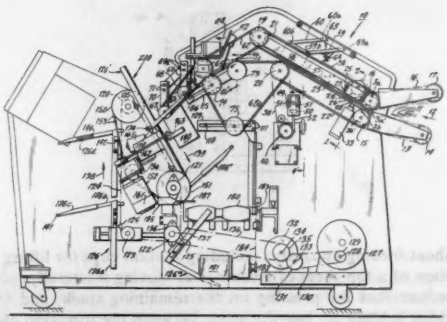
There is described apparatus for delivering sheets to be laid up in multisheet panels. The apparatus includes means for gripping sheets, and particularly sheets that are strong in a longitudinal direction but relatively weak in a transverse direction, along opposite edges thereof and substantially throughout the length of said edges, and swinging said sheets over a layup table where they are released. The apparatus preferably includes conveyor means for delivering sheets to the gripping means.



3,617,055
CONVEYOR FOR SIGNATURES

Sture Walter Stal, Solna, Sweden, assignor to AB Bonnierforetagen, Stockholm, Sweden

Filed May 27, 1968, Ser. No. 732,243
Claims priority, application Sweden, May 30, 1967, 7553/67
Int. Cl. B65h *33/00*
U.S. Cl. 271—88 **8 Claims**



A conveyor for newspapers and like signatures capable of accepting signatures delivered to the conveyor in a continuous stream and being arranged in overlapping fashion. The infeed conveyor section of the assembly is tilted at a point intermediate its upstream and downstream ends forming a bend which, together with a squeeze roller arrangement, acts to remove air captured between the pages of the signatures as well as between adjacent signatures. The downstream portion of the infeed conveyor is inclined at an angle which greatly facilitates stacking of the signatures upon buckets provided therefor, even though the rate of flow of signatures through the infeed conveyor is greatly reduced. The lower conveyor provided in the downstream portion thereof is made adjustable so that a portion thereof is positioned substantially parallel to and in close proximity to signatures being stacked upon each bucket to promote the formation of neat stacks upon the bucket. The adjustability feature permits the parallel portion to be moved closer toward or further away from the buckets, in accordance with signatures of smaller or larger dimensions, respectively. The tines of the bucket are made adjustable to permit their forward ends to be positioned in substantially the same spaced relationship relative to the parallel section of the above-mentioned lower

conveyor to facilitate the formation of signature stacks of the exact count desired. The forward end of the bucket tines, when in the intercept position, is slightly above and in very close proximity to the incoming signature stream to enable rapid intercept of the stream immediately upon receipt of an intercept signal. The upper and lower conveyors provided in the downstream section of the infeed conveyor are movably mounted relative to one another. However, the roller of the upper conveyor closest to the forward tines of the bucket is mounted in a stationary fashion, while the roller of the lower conveyor closest to the forward end of the bucket tines is resiliently loaded by spring loading means to assure the application of firm squeezing pressure upon the signature stream passing therebetween. The stationary mount of the roller in the upper conveyor closest to the forward end of the bucket tines enables very close positioning of the forward end of the bucket tines to the incoming stream, even though the two above-mentioned rollers are free to move relative to one another as the signature stream passes therebetween.

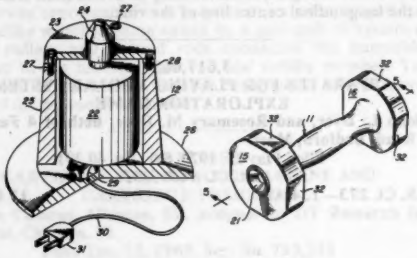
Sensing means is provided in the downstream section of the infeed conveyor for preventing operation of the stacker in the absence of signatures passing through the infeed conveyor downstream section. Additional means are provided for stopping operation of the stacker in the case where a signature becomes intertwined with the bucket tines as the bucket passes through the outfeed conveyor section.

3,617,056

INERTIA STARTER DUMBBELL EXERCISING SYSTEM

Robert J. Herbold, Scottsdale, Ariz., assignor to Southwestern Research Corporation

Filed Feb. 18, 1970, Ser. No. 12,273
Int. Cl. A63b 11/06, 11/04
U.S. Cl. 272—84 **4 Claims**



An exercising device provided which utilizes the precession effect exhibited by masses rotating at a relatively high angular velocity to resist changes in orientation of the axis of rotation. The device contains only the inertial elements which utilize a separate electric motor unit to accelerate the mass, the inertia of which provides the desired effect for several minutes after which it may again easily be accelerated for further use. The acceleration of the mass is accomplished by a clutch on the end of the electric motor shaft which is removably engageable with a rotatably mounted shaft which has the masses mounted thereon. Once the shaft and the mass has been caused to rotate at the required speed the clutch is disengaged from the rotating shaft. The shaft and the masses are rotatably mounted in a housing with a handgrip portion.

3,617,057

REMOVABLE STICK GAME

Adolph Eddy Goldfarb, 19434 Londelius St., Northridge, Calif., and Rene Soriano, Los Angeles, Calif.

Filed Mar. 17, 1970, Ser. No. 20,299
Int. Cl. A63f 9/00
U.S. Cl. 273—1 R **4 Claims**

A game and method of playing same which comprises a plurality of elongated sticks, preferably in groups of different indicia, and a ring through which the sticks are initially placed such that they can become freestanding in a generally

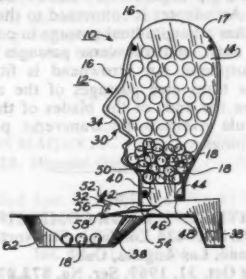
conical configuration. Cards are provided for indicating a stick of a given indicia to be removed from the freestanding sticks by pulling the same through the ring.

3,617,058

PLAY DEVICE

Adolph Eddy Goldfarb, 19434 Londelius St., Northridge, Calif., and Rene Soriano, Los Angeles, Calif.

Filed July 14, 1969, Ser. No. 841,473
Int. Cl. A63f 7/02
U.S. Cl. 273—1 R **12 Claims**



A play device comprising an upright receptacle having a pair of large, opposite and closely spaced sidewalls which are perforated and may be in the shape of a figure or an object. A plurality of small play pieces such as balls small enough to pass through the perforations are packed into the receptacle. The balls are interengaged with each other and the walls of the receptacle and supported in an unstable but equilibrium condition. By altering the support for the balls as by inserting a finger into a perforation to move one or more of the balls, the equilibrium is disturbed, which may cause one or a large number of the balls to be discharged and fall from the receptacle.

3,617,059

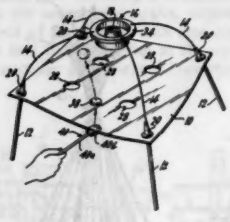
FLEXIBLE SHEET STRUCK FROM BELOW TO PROJECT GAME PIECES INTO TARGET

Perry J. Grant, Pacific Palisades, Calif., assignor to Reuben Klamer, Beverly Hills, Calif.

Filed Dec. 5, 1969, Ser. No. 882,651
Int. Cl. A63b 67/00
U.S. Cl. 273—95 G **1 Claim**

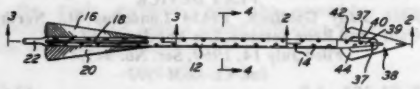
A game of skill for children is played with a stretched sheet of flexible material supported in an elevated position beneath a target cup and a plurality of playing pieces adapted to be

placed on the sheet at selected marked locations. Each player is provided with means for striking the underside of



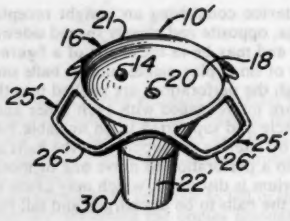
the sheet adjacent his playing pieces with the object of getting his pieces in the target cup.

3,617,060
PNEUMOTHOROX-INDUCING HUNTING ARROW
Warren Iezzi, 117 East Main St., Millville, N.J.
Filed Apr. 10, 1967, Ser. No. 629,644
Int. Cl. F41b *5/02*
U.S. Cl. 273—106.5 **1 Claim**



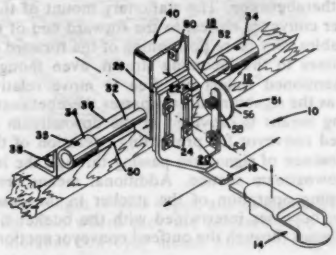
A hunting arrow is provided with a hollow shaft perforated along its length. An adapter is connected to the forward end of the shaft and has a longitudinal passage in communication with the hollow shaft, and transverse passages communicating to the atmosphere. An arrowhead is fitted over the adapter with the transverse passages of the adapter being disposed between the ends of the blades of the arrowhead. Where the ferrule overlies the transverse passages, it is formed with openings.

3,617,061
MANIPULATIVE DEVICE FOR COMPETITIVE PLAY
Adolph E. Goldfarb, 19434 Londelius St., Northridge, Calif., and Rene Soriano, Los Angeles, Calif.
Filed Oct. 31, 1969, Ser. No. 872,874
Int. Cl. A63b *67/00*
U.S. Cl. 273—110 **1 Claim**



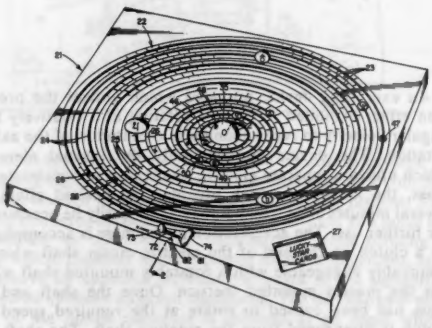
A manipulative device for competitive play by two or more participants comprising a platform having an upper playing surface. The surface has a central discharge opening and supports one or more mobile play pieces such as marbles for movement over the surface. The platform is connected at its edge to two or more individual handle means which are spaced apart around the platform and are grasped firmly by the participants who struggle or wrestle against one another to attempt to manipulate the platform to cause or prevent the marble from falling into the opening. The device also includes means connected to the underside of the platform below the opening to receive discharged marbles, and adapted to support the platform in a position elevated above a support surface such as a table while affording ready manipulation of the platform.

3,617,062
CURLING HACK ASSEMBLY
Ernest W. McPherson, R.R. #2, Calgary, Alberta, Canada
Filed Jan. 15, 1969, Ser. No. 791,249
Claims priority, application Canada, June 25, 1968, 023,428
Int. Cl. A63b *71/00*
U.S. Cl. 273—126 R **6 Claims**



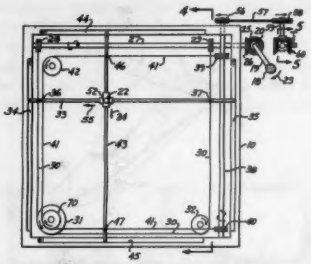
A curling hack assembly adapted for connection to an end portion on the ice rink having a footrest connected to an elongated rigid member. Said elongated member is connected to the end of the rink by a specially constructed bracket which permits the elongated member and the attached footrest to be pivoted upwardly away from the ice surface and which also permits the elongated member and the footrest to be adjusted laterally in a direction transverse to the longitudinal center line of the rink.

3,617,063
APPARATUS FOR PLAYING A SOLAR SYSTEM EXPLORATION GAME
Glenn L. Dyer, and Rosemary M. Dyer, both of 4 Fox Run Road, Bedford, Mass.
Filed May 25, 1970, Ser. No. 40,291
Int. Cl. A63f *3/02*
U.S. Cl. 273—134 AE **12 Claims**



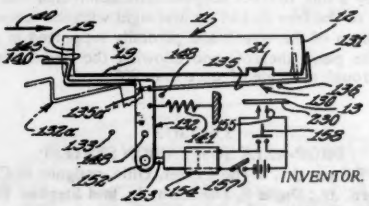
A space exploration game apparatus comprising a board having rotatably mounted at its center an object representing the sun. Surrounding said object are a series of circles concentric therewith, the annular bands between said circles being divided into segments by lines radiating from the center of the board. Between said circles are slots in which are movable objects representing planets which orbit the sun. The sun and planet representing objects are moved by a gear system comprising a drive shaft having an operating knob. The apparatus further comprises game pieces, dice, cards and play money.

3,617,064
GOLF GAME
Robert G. Collup, 675 Edgeview Drive, Sierra Madre, Calif.
Filed Apr. 29, 1970, Ser. No. 33,006
Int. Cl. A63b 67/02
U.S. Cl. 273—176 R 12 Claims



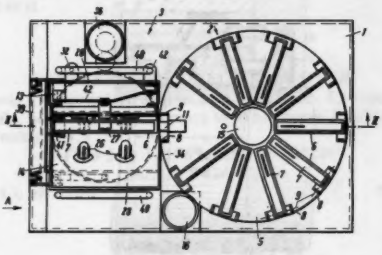
A device which indicates the distance and direction of flight of a struck golf ball includes a translucent disc rotatably mounted to a translucent cover plate on a housing. The disc includes indicia which portrays a representation of golf course fairways and greens. When viewed through the disc, a movable buttonlike member supported within the housing, below the plate, provides an indication of the position of a golf ball on the golf course fairway. The buttonlike member is adapted to be moved both along and laterally of the fairway representation in response to a tethered golf ball and teelike member being struck by a golf club. A system of gears, pulleys and carried rods connected the buttonlike member to the tethered golf ball and teelike member. The movement of the teelike member controls the lateral movement of the buttonlike member.

3,617,065
CARTRIDGE TRANSDUCER MACHINE AND CARTRIDGE THEREFOR
Marvin Camras, Glencoe, Ill., assignor to IIT Research Institute, Chicago, Ill.
Filed Jan. 23, 1969, Ser. No. 793,352
Int. Cl. G11b 5/00
U.S. Cl. 274—4 B 5 Claims



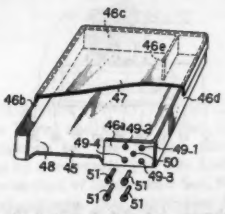
A tape cartridge transducer machine compatible with existing tape cartridges but provided with a cartridge ejection leverage mechanism which is actuated manually or by a solenoid to overcome the cartridge-biasing spring and shift the cartridge to an inactive standby position in the cartridge receiving space of the machine, after which the cartridge is manually removable with minimum effort. The machine preferably provides a balanced cartridge-biasing means to safeguard the cartridge against binding.

3,617,066
AUTOMATIC APPARATUS FOR SELECTIVELY PLAYING A PLURALITY OF TAPE CASSETTES
Wilhelm P. Foelkel, and Georg F. Seidel, both of Donlandwig, Germany, assignors to The Wurlitzer Company, Chicago, Ill.
Filed Jan. 30, 1969, Ser. No. 795,318
Claims priority, application Germany, Feb. 3, 1968, P 16 22 051.2
Int. Cl. G11b 15/12, 31/00
U.S. Cl. 274—4 F 6 Claims



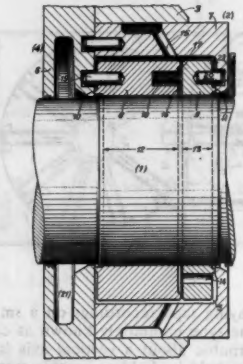
Apparatus for playing tape recordings on a small reel-to-reel cartridges of the type commonly known as cassettes. A rotary magazine turnable about a vertical axis is provided, and the cassettes are held by holders on this magazine with their planes disposed radially of the magazine and their longer dimensions disposed vertically. The magazine is turned to bring a selected cassette to a tape-playing station, and the cassette and its holder are tipped substantially 90° out from storage position, extending radially out from the magazine. Either of two duplicate playing mechanisms then is shifted generally normal to the faces of the cassette into driving and playing engagement with the cassette, whereby to play either of the two bands of information recorded on the tape.

3,617,067
ENDLESS MAGNETIC TAPE CARTRIDGE CASE
Itsuki Ban, 829, Higashi-Oizuminachi, Nerima-ku, Tokyo-to, Japan
Filed Apr. 21, 1969, Ser. No. 817,957
Claims priority, application Japan, Apr. 27, 1968, Oct. 2, 1968; 43/27989, 43/71141
Int. Cl. G11b 21/08, 1/00
U.S. Cl. 274—4 A 5 Claims



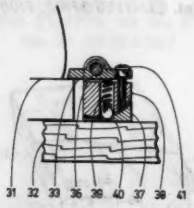
A case storing an endless magnetic tape cartridge having a tape providing a plurality of playing tracks and received in a tape cartridge player including a track-changing device having a track selection control member, said case comprising a base portion, a wall portion consisting of a front wall, two sidewalls and rear wall each of which extends upwardly from the base portion, a cover member resting atop the wall portion, and a partition wall extending upwardly from the base portion. A cartridge receptacle is formed by being encased by the partition wall, the front wall, one of the sidewalls and the rear wall, and an opening is provided in the front wall opposite to the leading edge of the tape cartridge, and a plurality of track selection members is provided in the front wall to correspond to each of the playing tracks on the tape for selectively operating the track selection device.

3,617,068
FLOATING RING SEAL FOR ROTATING SHAFTS
Walter Sprenger, Wiesendangen, Switzerland, assignor to Brown-Boveri-Sulzer, Turbomachinery Ltd., Zurich, Switzerland
Filed Feb. 27, 1970, Ser. No. 15,122
Claims priority, application Switzerland, Feb. 28, 1969, 3015/69
Int. Cl. F16j 9/00, 15/40
U.S. Cl. 277—62 8 Claims



The two sealing rings are arranged so that substantially all the sealant and coolant medium flows first through the sealing ring on the high-pressure side to dissipate heat therein. The medium then flows into the space between the sealing rings and is distributed into the sealing gaps between the sealing rings and shaft.

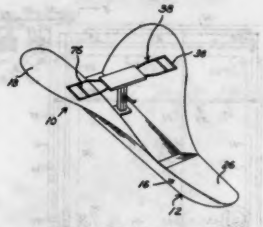
3,617,069
RESILIENT ATTACHMENT FOR SKIS
Georges P. J. Salomon, 34, Avenue de Loverchy, Annecy, Haute-Savoir, France
Filed Jan. 2, 1968, Ser. No. 695,153
Claims priority, application France, Jan. 4, 1967, 89,992
Int. Cl. A63c 9/084
U.S. Cl. 280—11.35 3 Claims



A resilient attachment for skis in which the resilient function of the attachment is obtained by means of a resilient assembly including a spring that ensures safety locking of the attachment. One of the ends of the spring receives, either directly or not, the mechanical action that ensures resiliency and the other end acts on the locking device of the attachment.

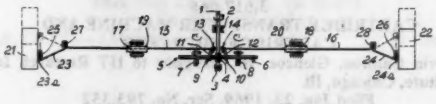
3,617,070
AMPHIBIOUS, STEERABLE, GLIDING VEHICLE
Arthur C. Roberts, 4274 Griffin Creek Road, Medford, Oreg.
Filed Mar. 2, 1970, Ser. No. 5,361
Int. Cl. B62b 13/04
U.S. Cl. 280—21 10 Claims

A single-rider gliding vehicle is provided, operable by gravity on snow-covered slopes, and by a towrope on the water, and steerable in either case by tilting and/or jerking of the vehicle body to the right or left. All surface portions of the vehicle are desirably composed of a hard, smooth, abrasion-proof material such as fiber-glass-reinforced polyester, but a body of flotation material such s styrofoam is enclosed in the floor portion in sufficient quantity to assure that the vehicle will float when separated in the water from the rider. Parallel, projecting, longitudinally extending runners are provided on the bottom of the vehicle for snow-steering control.



The vehicle includes a seat assembly which comprises a tow latch, maintained effective by the weight of a rider on the seat, but automatically rendered ineffective when the rider relieves the seat of a critical portion, at least, of his weight. A cross brace or reinforcing unit extends across the body and provides handholds at opposite sides of the seat which are useful for steering, for detaching a towrope for carrying the vehicle, for giving the rider a firm hold on the vehicle, and for braking.

3,617,071
STEERING MECHANISM FOR AUTOMOBILES
Davor Ivancic, Via Ticino, San Donato Milanese(Province of Milan), Italy
Filed Apr. 2, 1970, Ser. No. 29,349
Claims priority, application Italy, Mar. 5, 1969, Apr. 5, 1969; 16388/69, 15171/69
Int. Cl. B62d 7/08
U.S. Cl. 280—96 5 Claims

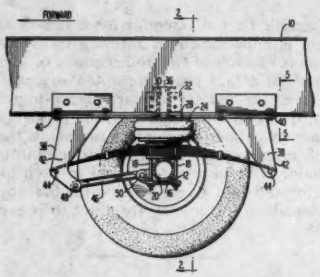


Steering mechanism for the front wheels of an automobile comprising a crank gear transmission controlled by the steering wheel and transmitting a reciprocating and angular motion to a connecting rod supported in an intermediate point thereof by a link bracket support. The connected rod is articulated to the free end of an arm rigid with the supporting hub or drum of the wheel, and pivotally supported in an intermediate point thereof, and allowing the front wheel to swivel through an angle of more than 90°.

3,617,072
DROP-AXLE SUSPENSION SYSTEM
Stephen Turner, Jr., Berlin Center, Ohio, assignor to Charles E. Wern, Jr.; David S. Dennison, Jr. and Stephen Turner, Jr., Warren, Ohio
Filed Feb. 17, 1970, Ser. No. 12,050
Int. Cl. B60g 11/46
U.S. Cl. 280—124 12 Claims

There is provided in an auxiliary axle suspension system for wheeled vehicles an improvement for insuring the safety of said suspension when under heavy load, particularly about 6,000 lbs. per axle or greater, which comprises an axle having mounted at its outer extremities two wheels on either side thereof for carrying such a heavy load along the path of travel of the vehicle. Inwardly of each pair of wheels and immediately adjacent to each respective pair of wheels there is provided a leaf spring of a plurality of leaves and means for connecting the leaf spring at about its respective ends to the

longitudinal I-beam frame members of the vehicle and extending longitudinally on either side thereof. Each leaf spring has its intermediate portion overlying and being secured by bolt means to the axle such that the leaf springs are normally biased upwardly to raise the axle and the wheels mounted thereon above the surface along which the vehicle travels. Juxtapositioned between each leaf spring and its respective frame member is at least one vertically flexible pneumatic chamber which may be expanded or contracted vertically by applying pneumatic pressure thereto to thereby bias the axle downwardly against the force exerted by the springs to lower the wheels mounted thereon into contact with the vehicle travel surface. Torque arms are provided which extend in the forward direction of the vehicle and are connected between the bolt means for connecting the axle to the frame member



and the means for connecting each respective leaf spring at about their ends to the vehicle. In addition, the leaf springs are not secured to the means which connect them at about their ends to the frame member of the vehicle, but rather, are connected in a manner which allows them to slide longitudinally therewithin. Upon braking under heavy load, the leaf springs are protected from undue torque forces by the torque arms and the slidable nature of the leaf spring connection.

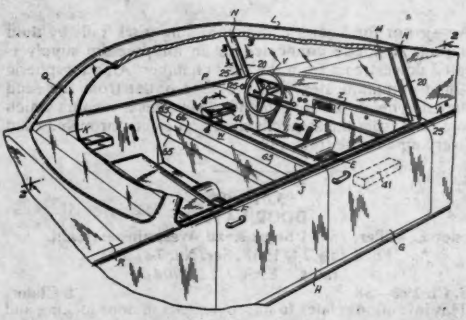
In addition to the above, there is also provided a means for connecting the leaf spring connecting means to the frame member of the vehicle which comprises a bracket and two angle irons in combination such that bolts are provided through the longitudinal member of the I-beam frame member but not through the lateral flange thereof, thus protecting the frame member from its tendency to crack if its flanges are violated by bolts.

3,617,073

AUTOMOBILE SAFETY SYSTEM

Irving Landsman, and Emanuel Landsman, both of 365 Central Park Ave., New York, N.Y.

Filed Sept. 17, 1969, Ser. No. 858,592
Int. Cl. B60r *21/08*
U.S. Cl. 280—150 AB **10 Claims**



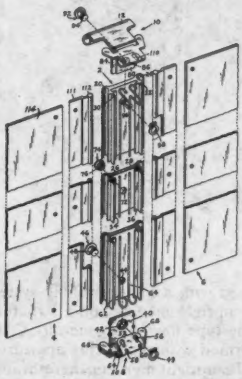
The present disclosure relates to an automobile safety system which provides that inflated members shall be ejected across the body of the driver and passengers without obstructing their vision and also across the lower windshield to prevent physical injury. The inflated members are supplied by a tank of compressed air or other fluid positioned in the interior of the automotive vehicle under the hood or in the rear baggage compartment and the inflation and release of the inflated members takes place as the result of extra pressure on the foot or pedal brake. The inflatable members, when not in use, are desirably collapsed into receivers on the side posts along the windshield and also in receptacles along the interior of the doors. The rear compartment may be provided with an inflatable member positioned in the back of the front seat.

3,617,074

TELEPHONE DIRECTORY COVER

Venerio J. Rigolini, Brooklyn, and William L. Lawson, Forest Hills, both of N.Y., assignors to Whitehouse Products, Inc., Brooklyn, N.Y.

Filed July 1, 1969, Ser. No. 838,064
Int. Cl. B42d *17/00*
U.S. Cl. 281—34 **9 Claims**



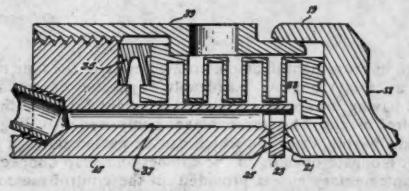
A telephone directory binder cover having a backer plate, top and bottom plates removably attached to the backer plate and front and back covers, the backer plate having C-shaped recesses extending longitudinally of the backer plate along the marginal edges thereof, the covers having cylindrical edges in said C-shaped recesses, the recesses and cylindrical edges forming a hinge mounting between the backer plate and the cover, the assembled binder cover being adaptable for hinge, cable, or chain mounting.

3,617,075

QUICK DISCONNECT COUPLING SEAL

Paul W. Van Horn, and Glen F. Doel, both of Los Angeles, Calif., assignors to The United States of America as represented by the Secretary of The United States Air Force

Continuation-in-part of application Ser. No. 774,271, Nov. 8, 1968, now abandoned. This application June 10, 1970, Ser. No. 45,214
Int. Cl. F16l *55/00*
U.S. Cl. 285—13 **3 Claims**



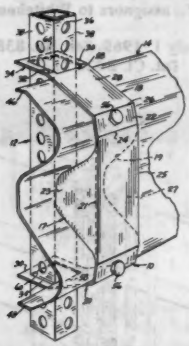
Quick disconnect coupling means for connecting and sealing two matching conduits having interengaging flanges with

dual sealing assemblies disposed therebetween. Pivotal latching means are clamped against both flanges by axially directed pressure from a spring-loaded piston and cylinder arrangement carried by the engaged flange of one of the matching conduits.

3,617,076
FASTENING CLAMP

Warren R. Attwood, Wayne, and Herbert J. Henry, Dearborn Heights, both of Mich., assignors to Unistrut Corporation, Wayne, Mich.

Continuation-in-part of application Ser. No. 678,692, Oct. 27, 1967, now abandoned. This application Aug. 27, 1969, Ser. No. 853,412
Int. Cl. F16b *7/00*
U.S. Cl. 287—51 **6 Claims**

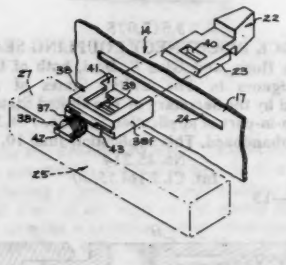


A clamp used with a metal framing system for adjustably supporting an upright member on a structural member. The clamp is of the type having a generally C-shaped configuration and is formed with registering apertures therein for the reception of the upright member therethrough to be retained by pressure-exerting means.

3,617,077
KNOB MEANS FOR ELECTRONIC DEVICE SLIDEABLE CONTROL

Gerald J. Cavanaugh, Sr., Chesapeake, Va., assignor to General Electric Company

Filed Oct. 3, 1969, Ser. No. 863,546
Int. Cl. F16d *1/06*
U.S. Cl. 287—53 H **2 Claims**

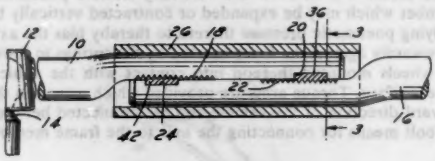


An improvement in an electronic device of the type including a cabinet housing a slideably adjustable control means and having an opening for passing means for operating the control means. The improvement comprises providing knob means having a portion which can be passed through a narrow, elongate opening in the cabinet and snap connected to complementary means provided on the control means such that no additional fastener means other than the complementary means are required to maintain connection of the knob means to the control means.

3,617,078
ADJUSTABLE TIE ROD LINKAGE

Jonas Valukonis, Detroit, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Oct. 7, 1969, Ser. No. 864,441
Int. Cl. F16b *7/00*
U.S. Cl. 287—104 **11 Claims**

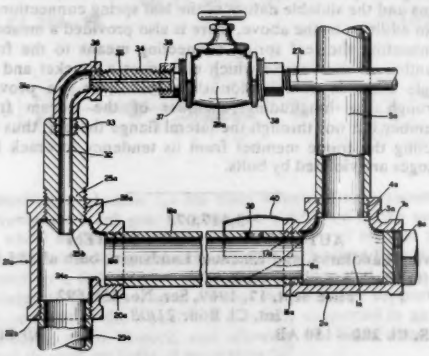


An adjustable tie rod assembly for a vehicle steering linkage system is constructed by forming transverse serrations near the ends of each of two rod sections or elements. Each rod section has a lock-receiving notch spaced from its serrated portion. The rod sections are placed together with the serrations of one in alignment with the lock-receiving notch of the other. A cylindrical retainer surrounds the rods and a pair of soft metal locking inserts are driven through openings in the retainer. An insert is received in each locking notch and is deformed into engagement with the adjacent serrations. The ends of the inserts are upset to prevent their displacement.

3,617,079
FLUIDIZED SAND TRAP EJECTOR

Waldama Bente, 314 Miller Ave., Dennison, Ohio

Continuation-in-part of application Ser. No. 841,397, July 14, 1969, now abandoned. This application Dec. 10, 1969, Ser. No. 883,832
Int. Cl. B60b *39/08*, **B61c** *15/10* **and B65g** *53/54*
U.S. Cl. 291—3 **5 Claims**



An ejector for a sand trap for sanding track rails by fluid eduction. A nozzle connected to an air pressure supply is located downstream from the sand chamber. An atmospheric air inlet communicates with the sand outlet from the sand chamber. The air jet from the nozzle creates a vacuum which draws sand from the sand chamber and ejects through a sand delivery pipe to the track rail.

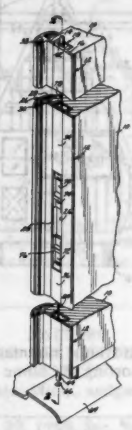
3,617,080
DOOR LATCH

Wesley E. Miller, 13411 Sioux Road, Westminster, Calif.

Filed July 24, 1968, Ser. No. 747,293
Int. Cl. E05c *1/12*, *9/04*
U.S. Cl. 292—38 **8 Claims**

This invention relates to improvements in door locking and latching apparatus suitable for use with double or swinging doors and with sliding doors. The embodiment illustrated and described in the specification includes a plate which overlies

the free edge of one door. The vertical central section of that plate is recessed for the full height of the door and latching apparatus including an upper and lower bolt, means to bias those bolts upward and downwardly respectively, and means



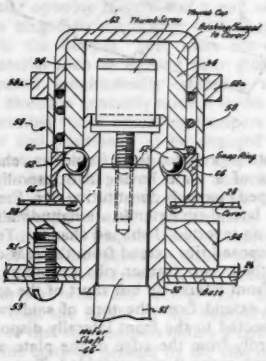
for retracting the bolts are all disposed within the recess. The upper bolt is adapted to cooperate with a catch in the door frame above the door and the lower bolt is adapted to cooperate with a catch opening in the threshold.

3,617,081

LATCHING MECHANISM

Kenneth G. Drucker, Astoria, Oreg., assignor to Bio-Consultants Inc., South Gate, Calif.

Filed Feb. 27, 1970, Ser. No. 14,961
Int. Cl. E05c *19/04*; A47j *27/08, 36/10*
U.S. Cl. 292—252 7 Claims



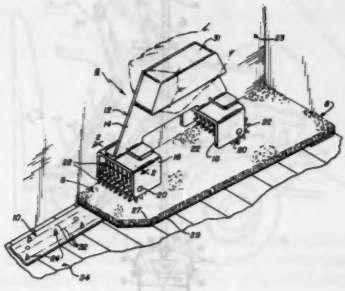
A latching mechanism is provided which, for example, may be used to mount a cover over the rotor head of a microhematocrit-type centrifuge, and which permits the cover conveniently to be placed and latched onto the head, and just as conveniently to be unlatched and removed. The centrifuge rotor head, for example, may be of the type which supports a plurality of capillary tubes in general radial positions, the tubes containing solutions to be subjected to centrifugal separation of their constituents, and the cover serves to hold the tubes in place in radial slots on the base.

3,617,082

CARPET ROLLER

Robert A. Sparks, Clearwater, Fla., assignor to S & S Tool Company, Clearwater, Fla.

Filed Mar. 5, 1969, Ser. No. 804,618
Int. Cl. A47g *27/04*
U.S. Cl. 294—8.6 1 Claim



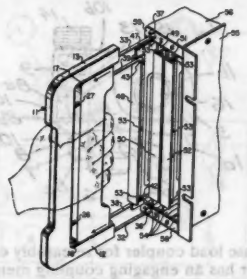
A carpet roller for quickly tacking a carpet to a tack strip. The carpet roller has toothed wheels which are adapted to ride over and between the tacks of a tack strip without damaging the tacks while depressing the mat of a carpet between the tacks.

3,617,083

TOOL FOR EXTRACTING PRINTED CIRCUIT CARDS FROM CARD FILES

James V. Koppensteiner, Chicago, and Joseph J. Bakalik, Hinsdale, both of Ill., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Dec. 18, 1969, Ser. No. 886,134
Int. Cl. B65g *7/02*
U.S. Cl. 294—15 6 Claims



A tool, for extracting printed circuit cards from a card file, having an inner grip section interlocked and slidably mounted within a U-shaped outer grip section, and held in this mounting by a slide-limiting screw having its threaded end secured in the outer grip and its head end slidably engaged by the inner grip. The inner grip is normally biased away from the outer grip and into engagement with the limiting screw by compression springs engaging both grips. Card extractor arms are permanently installed in the outer side edge of each end of the inner grip, and a pushoff rod is permanently installed in the end of each U-leg of the outer grip, with each rod extending in a plane parallel with the adjacent associated extractor arm.

3,617,084

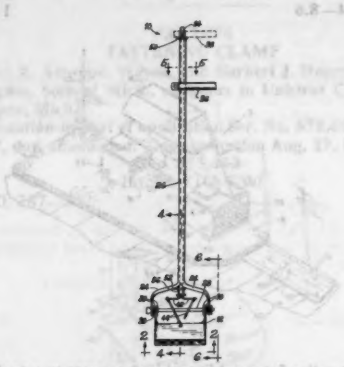
HAND-OPERATED SHOVEL FOR PICKING UP REFUSE

Jerry Mares, 5611 S. Parkside, Chicago, Ill.

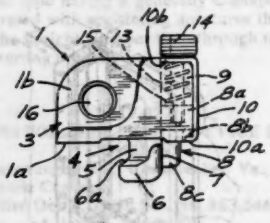
Filed May 7, 1969, Ser. No. 822,483
Int. Cl. A01b *1/16*
U.S. Cl. 294—50.6 2 Claims

The shovel, which is especially well adapted for picking up pet manure or other similar refuse, comprises a pair of

clamshell scoops pivotally mounted on supporting arms at the lower end of an outer tubular shaft. The scoops are biased toward their closed position by means of springs. An inner shaft is rotatably mounted within the outer shaft. First and second handles extend radially from the upper end portions of the inner and outer shafts so that the shovel can be held in both hands for easy operation. Lever arms extend radially from the lower end of the inner shaft and are connected to the scoops by means of links, so that the scoops can be opened and closed by turning the inner shaft.



3,617,085
QUICK-RELEASE LOAD COUPLER
Henry J. Modrey, 158 Eagle Drive, Stamford, Conn.
Filed Oct. 24, 1969, Ser. No. 869,294
Int. Cl. B66c *1/36*
U.S. Cl. 294—83 **5 Claims**

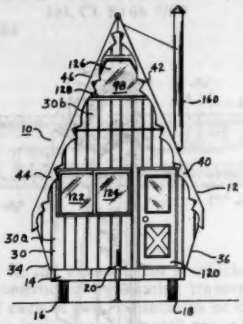


A quick-release load coupler for releasably coupling a load to a load carrier has an engaging coupling member including a housing to which the load is coupled.

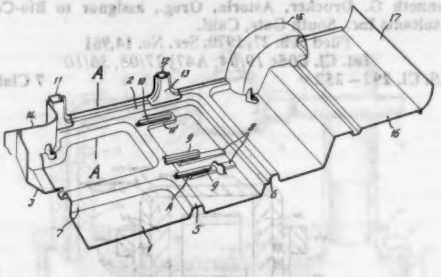
The engaging coupling member locks itself automatically to the receiving coupling member when applied thereto and can be released from said member by withdrawing a locking slide relative to a clamping rod which is axially stationary relative to the housing. Release of the coupler can be effected irrespective whether the coupler is under load or not. Both the locking and the releasing motions are in axial direction.

3,617,086
FOLDABLE AND TRANSPORTABLE HOME
Roger A. King, and Keith O. Burton, both of Elkhart, Ind., assignors to Bur Kin Homes Corporation, Whitepigeon, Mich.
Filed Oct. 10, 1969, Ser. No. 865,290
Int. Cl. B60p *3/34*
U.S. Cl. 296—23 **14 Claims**

A foldable and transportable home having two sidewalls and end walls forming a body, with the two end walls having an upper and lower portion. The upper portion is hinged to the lower portion and is triangular in shape and folds inwardly and downwardly. The roof includes two lower and two upper roof sections forming a gable configuration, with one of the two upper sections hinged on one side to one lower roof section, the two upper sections being hinged together to fold downwardly over the other lower roof section. The body is removably mounted on a frame and undercarriage for transporting the home and forming a temporary base for the unit.



3,617,087
FLOOR PLATE FOR A FRAMELESS VEHICLE
Takefumi Hiramatsu, Kitaadachi-gun, Saitama-ken, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Sept. 25, 1969, Ser. No. 861,081
Claims priority, application Japan, Sept. 26, 1968, 43/83947
Int. Cl. B62d *21/10*
U.S. Cl. 296—28 F **4 Claims**

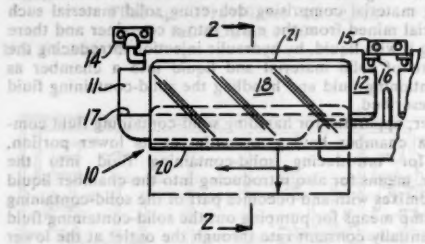


A floor plate is provided for a frameless vehicle. This floor plate consists of a plate having two laterally disposed inverted U-shaped channels constituting ribs. From the front of the foremost lateral rib extends a longitudinally disposed rib which is also an inverted U-shaped channel. Two further longitudinally disposed ribs extend from the rear of the first said lateral ribs, these two further ribs extending longitudinally towards the front lateral rib but short of the same. Reinforcing elements extend from the tops of said two further ribs and are connected to the front laterally disposed rib. Pillars extend upwardly from the edge of the plate and a rearward extending trunk space is also provided. Two reinforcing elements forming the base for a seat along with the aforesaid reinforcing elements are also incorporated into the floor plate.

3,617,088
SUNVISOR EXTENDER
Virgil E. Graham, Box 47, Hershey, Nebr.
Filed Jan. 27, 1970, Ser. No. 6,139
Int. Cl. B60j *3/02*
U.S. Cl. 296—97 C **4 Claims**

An extender for motor vehicle sunvisors which in one form of the invention has a form of a sleeve which encompasses

the sunvisor and can be moved downwardly and sideways thereon to cover additional areas not normally covered by the sunvisor. In another form of the invention a metal clip attached to the sunvisor supports the extender which is positioned on one side of the sunvisor. Still another form of the invention has a metal clip secured to the extender with metal clip engaging the opposite side of the sunvisor from the extender.

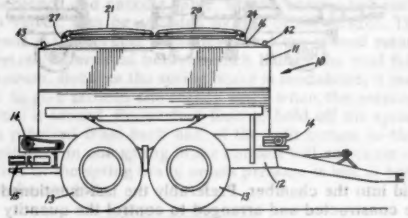


3,617,089

COVER MEANS FOR AGRICULTURAL TRANSPORT DEVICES

Loren E. Tyler, Wayzata, Minn., assignor to Letco, Inc., Long Lake, Minn.

Filed Sept. 29, 1969, Ser. No. 861,822
Int. Cl. B62d *25/00*
U.S. Cl. 296—137 B **12 Claims**



An agricultural transport device such as a fertilizer spreader having a relatively large hopper with a top with a large rectangular opening therein and a pair of cooperating door members hinged to the hopper and closable to cover the opening in the hopper. The doors are formed of a lightweight material such as molded fiber glass and have a plurality of spaced, longitudinally extending, stiffening ribs extending in a direction generally normal to the hinged edges thereof. Cooperating shock absorbing bumpers are mounted on the hopper and positioned to be engaged by the door when it is opened and these bumpers are disposed so as to be engaged by the ribs of the door which constitutes the portions of greatest strength thereof. The doors are arched so that the greatest height thereof is substantially at the center of each door and one of the ribs extends therethrough with the remainder of the ribs spaced on either side thereof. The bumpers are disposed for cooperation with these ribs and the bumper cooperable with the center rib has a height somewhat less than the height of the bumpers cooperating with other ribs so that the bumpers define a contour substantially equal to the contour defined by the ribs of the door to substantially equally distribute the shock when the door is thrown open against the bumpers.

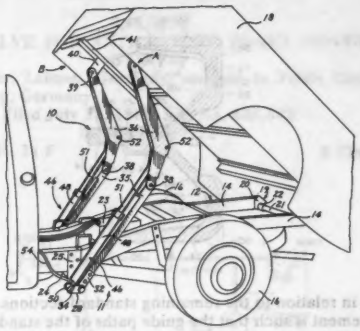
3,617,090

HOIST FOR VEHICLE MOUNTED BOX

Samuel Edgar Huffman, Eaton, and Kenneth R. Davisson, Severence, both of Colo., assignors to Hydraulics Unlimited Mfg. Co., Eaton, Colo.

Filed Sept. 15, 1969, Ser. No. 857,924
Int. Cl. B60p *1/16*
U.S. Cl. 298—22 J **6 Claims**

The hoist for a vehicle mounted box or bed is a jackknife or scissors-type hoist powered by a pressure fluid motor, and includes two parallel lifting mechanisms mounted outboard of the vehicle chassis, on the extending ends of a torsion bar journaled transversely on the chassis, and with the free ends of the hoist mechanism secured to the underside of the vehicle box. The box is hinged at the rear end of the vehicle for tilting movement.

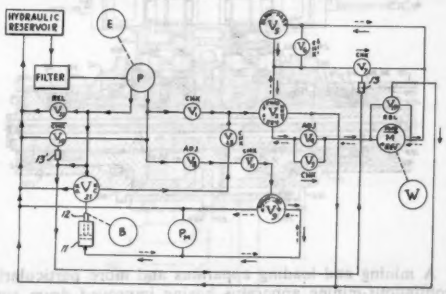


3,617,091

SAW CONTROL SYSTEM

William D. Mooney, Warminster, and Albert S. Polis, Philadelphia, both of Pa., assignors to Cardinal Engineering Corporation, Conshohocken, Pa.

Filed May 26, 1970, Ser. No. 40,529
Int. Cl. E01c *23/09*
U.S. Cl. 299—39 **18 Claims**



A self-propelled saw machine having a vertically adjustable rotary blade for cutting or grooving concrete or similarly durable flooring or paving material is provided with hydraulic control of the blade height and of the rate of machine travel, both forward and reverse, including a creep speed when the blade is in lowered cutting position and a faster over-the-road speed when the blade is in raised noncutting position.

3,617,092

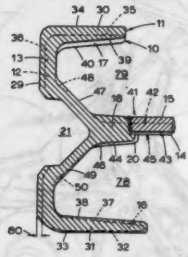
SCRAPER-CHAIN CONVEYORS

Oskar Kohler, Lunen-Sud, and Wulff Rosler, Westfalia, both of Germany, assignors to Gewerkschaft Eisenhutte Westfalia, Westfalia, Germany

Continuation-in-part of application Ser. No. 666,575, Sept. 11, 1967, now abandoned. This application Oct. 15, 1969, Ser. No. 866,657
Int. Cl. E21c *29/02*; B65g *19/28*
U.S. Cl. 299—43 **8 Claims**

A scraper-chain conveyor for use in mineral mining installations, and composed of individual channel sections joined end to end. Each channel section is composed of sigma-shaped side members adjoined by a conveyor bottom wall

and defines upper and lower guide paths for the working and return chains runs of the conveyor. Some of the channel sections are superstandard and of selective reinforced construc-



tion in relation to the remaining standard sections. Such reinforcement is such that the guide paths of the standard and superstandard sections are substantially in alignment with one another to provide unhindered travel for the chain runs.

3,617,093

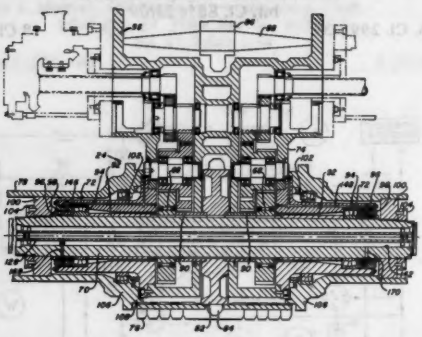
MINING MACHINE DRUM CUTTER EXTENSION MEANS

Glenn A. Daily, R.D. 1, Utica, Pa.

Continuation of application Ser. No. 786,648, Dec. 24, 1968, now abandoned. This application Sept. 14, 1970, Ser. No. 72,239

Int. Cl. E21c *27/24, 35/20*

U.S. Cl. 299—80 **13 Claims**



A mining and loading apparatus and more particularly a continuous-mining apparatus having improved drum cutter extension means for dislodging mineral from a solid mine vein. This drum cutter incorporates a double passageway head shaft for activating hydraulic cylinders to extend and retract extensible drum portions of the drum cutter.

3,617,094

METHOD AND APPARATUS FOR HANDLING MATERIAL

Harold O. Kester, Loveland, Colo., assignor to The Eagle Construction Corporation, Loveland, Colo.

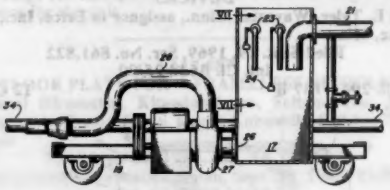
Filed Mar. 11, 1970, Ser. No. 18,581

Int. Cl. B65g *53/30*

U.S. Cl. 302—14 **1 Claim**

A method of handling solid-containing fluid comprising introducing solid-containing fluid into a chamber, also introducing into the chamber liquid which admixes with and becomes part of the solid-containing fluid, pumping out the solid-containing fluid at substantially constant rate through an outlet at the lower portion of the chamber and controlling the quantity of said liquid introduced into the chamber so that the level of fluid in the chamber is maintained above the outlet despite fluctuation in the rate of introduction of solid-containing fluid into the chamber. Preferably the quantity of said liquid introduced into the chamber is controlled so that the level of fluid in the chamber is maintained substantially constant despite fluctuation in the rate of introduction of solid-containing fluid into the chamber. Also a method of handling material comprising delivering solid material such as material mined from the earth into a container and there admixing it with liquid, by hydraulic injection introducing the admixture of solid material and liquid into a chamber as solid-containing fluid and handling the solid-containing fluid as just described.

Further, apparatus for handling solid-containing fluid comprising a chamber having an outlet at its lower portion, means for introducing solid-containing fluid into the chamber, means for also introducing into the chamber liquid which admixes with and becomes part of the solid-containing fluid, pump means for pumping out the solid-containing fluid at substantially constant rate through the outlet at the lower portion of the chamber and means for controlling the quantity of said liquid introduced into the chamber so that the level of fluid in the chamber is maintained above the outlet despite fluctuation in the rate of introduction of solid-containing



fluid into the chamber. Preferably the last-mentioned means are constructed and arranged to control the quantity of said liquid introduced into the chamber so that the level of fluid in the chamber is maintained substantially constant despite fluctuation in the rate of introduction of solid-containing fluid into the chamber. The last-mentioned means may comprise float-controlled valve means, preferably two float-controlled valves with the floats at different elevations.

Also, apparatus for handling material comprising a container, means for delivering solid material such as material mined from the earth into the container for admixture with the solid material, a chamber having an outlet at its lower portion, hydraulic injection means introducing the admixture of solid material and liquid into the chamber as solid-containing fluid, means for also introducing into the chamber liquid which admixes with and becomes part of the solid-containing fluid, pump means for pumping out the solid-containing fluid at substantially constant rate through the outlet at the lower portion of the chamber and means for controlling the quantity of said liquid introduced into the chamber so that the level of fluid in the chamber is maintained above the outlet despite fluctuation in the rate of introduction of solid-containing fluid into the chamber.

3,617,095

METHOD OF TRANSPORTING BULK SOLIDS

Kenneth J. Lissant, St. Louis, Mo., assignor to Petrolite Corporation, Wilmington, Del.

Filed Oct. 18, 1967, Ser. No. 676,047

Int. Cl. B65g *53/04*

U.S. Cl. 302—66 **7 Claims**

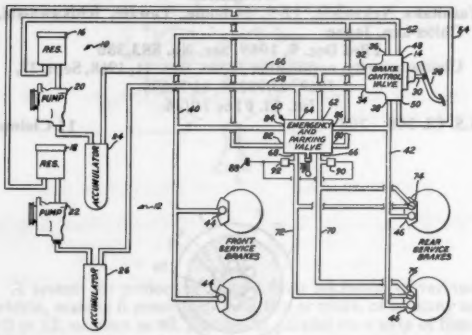
A process of transporting bulk solids such as bulk chemicals, grains, coal, ores, etc. through enclosed channels or ducts, such as pipes or pipelines, which is characterized by moving, such as by pumping, insoluble bulk solids suspended in a pseudo-plastic fluid exhibiting non-Newtonian viscosity properties, as exemplified by thixotropic emulsions, through such enclosed channels.

3,617,096

AUXILIARY HYDRAULIC BRAKING SYSTEMS

Frederick G. Grabb; Keith H. Fulmer, and Harold B. Schultz, all of South Bend, Ind., assignors to The Bendix Corporation

Filed Apr. 27, 1970, Ser. No. 32,018
Int. Cl. B60t *13/04*
U.S. Cl. 303—9 11 Claims



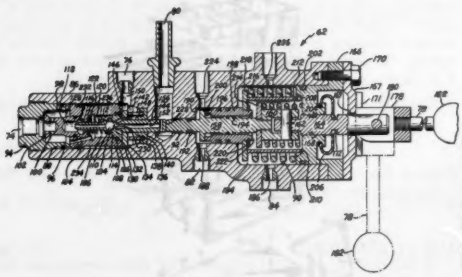
A emergency and parking valve used in a dual full-power system that provides two means to hold off a spring brake. The emergency and parking valve, which contains two independent valves, may be actuated by one of two means. The first means is the parking brake lever and the second means is a pressure differential between each half of the dual full-power system. Because the spring brake is modulated, it may be used to give smooth emergency stops when the pressure differential is sensed. Pressurized fluid to hold off the spring brake is received from each half of the split system so that loss of pressure in one spring brake conduit will not cause an application of the spring brake unless pressure is lost in both spring brake conduits.

3,617,097

PARKING AND EMERGENCY BRAKING SYSTEM

Frederick G. Grabb, South Bend, Ind., assignor to The Bendix Corporation

Filed Apr. 15, 1970, Ser. No. 28,843
Int. Cl. B60t *13/22*
U.S. Cl. 303—13 4 Claims



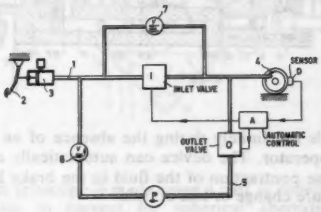
A spring brake used in a dual full-power braking system to provide parking and emergency braking. The modulated spring brake is controlled by an inversion valve that has an override system whereby the emergency braking is not applied unless the front brakes have a pressure differential greater than a predetermined amount in the rear brakes. From this pressure differential, the spring brakes are applied simultaneously with the front brakes to provide the necessary emergency stopping. The amount of application of the spring brakes is proportional to the amount of pressure differential in excess of the predetermined amount. The parking brake is an externally connected cam and lever mechanism for operating the inversion valve.

3,617,098

INLET VALVE FOR ANTILOCKING BRAKE CONTROL SYSTEM

Heinz Leiber, Leimen, Germany, assignor to Teldix GmbH, Heidelberg, Germany

Filed July 31, 1969, Ser. No. 846,443
Int. Cl. B60t *8/12*
U.S. Cl. 303—21 F 8 Claims



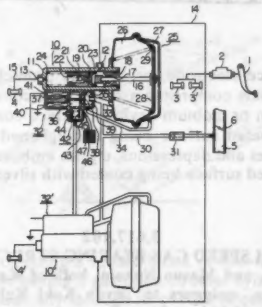
The inlet valve of an antilocking control system for vehicle brakes is constructed to possess low-response time and a check valve in parallel with the inlet valve is provided to prevent undesirable check valve action by the inlet valve.

3,617,099

ANTISPIN DEVICE FOR MOTOR VEHICLES

Hiroshi Sugiyama, Hiratsuka, Japan, assignor to Nissan Motor Company, Limited, Kanagawa-ku, Yokohama, Japan

Filed Nov. 10, 1969, Ser. No. 875,160
Claims priority, application Japan, Nov. 12, 1968, Dec. 10, 1968; 43/82,245, 43/89,907
Int. Cl. B60t *8/02, 13/68*
U.S. Cl. 303—21 EB 13 Claims



An antispin device for use in combination with a braking system of a motor vehicle, having a spin detector unit and brake-actuating unit. The spin detecting unit detects the difference between the right and left driving wheels and delivers a voltage as soon as the difference exceeds a predetermined level and the brake-actuating unit responds to the voltage to actuate the wheel cylinder of the driving wheel rotating at a higher speed than the other.

3,617,100

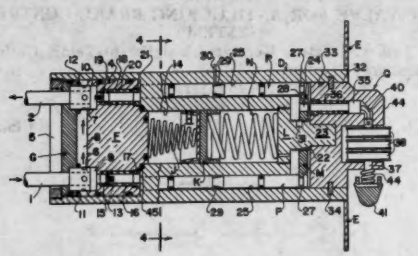
ANTI-THEFT BRAKE MONITORING DEVICE FOR VEHICLES

John G. Wrigley, San Leandro, Calif., and Dennis Portch, 2495 Prosperity Way, Hayward, Calif.

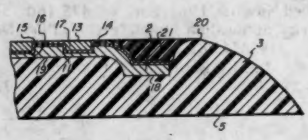
Filed May 18, 1970, Ser. No. 38,159
Int. Cl. B60r *25/08*
U.S. Cl. 303—89 8 Claims

An antitheft brake monitoring device for vehicles which is mounted in the instrument panel of a vehicle and is con-

nected into the brake fluid line that extends from the master cylinder, or power brake booster, to the brake wheel cylinders. The device can be controlled by a combination locking device for holding an applied brake action on all of the vehicle wheels indefinitely during the absence of an authorized vehicle operator. The device can automatically compensate for volume contraction of the fluid in the brake lines due to temperature change or loss of fluid.

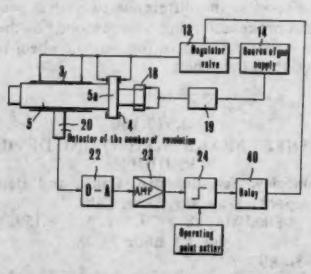


3,617,101
REFERENCE ELECTRODE FOR CATHODIC PROTECTION SYSTEMS
Edward P. Anderson, Livingston, N.J., assignor to Engelhard Minerals & Chemicals Corporation, Newark, N.J.
Filed June 13, 1969, Ser. No. 833,097
Int. Cl. C23f *13/00*
U.S. Cl. 204—196 **3 Claims**



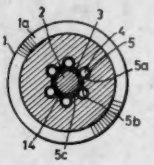
A reference electrode for cathodic protection systems on ships and boats comprising a metal base consisting of titanium, tantalum or niobium having a surface coated with silver, the silver-coated surface being a roughened surface in the form of ridges and depressions, e.g. an embossed surface, and the roughened surface being coated with silver chloride.

3,617,102
HIGH SPEED GAS BEARING STRUCTURES
Ryuji Wada, and Masuo Nakato, both of Kariya-shi, Aichi-ken, Japan, assignors to Toyda Koki Kabushiki Kaisha, Kariya-shi, Aichi-ken, Japan
Filed Sept. 8, 1969, Ser. No. 856,060
Claims priority, application Japan, Sept. 17, 1968, 43/67057
Int. Cl. F16c *1/24*
U.S. Cl. 308—122 **6 Claims**



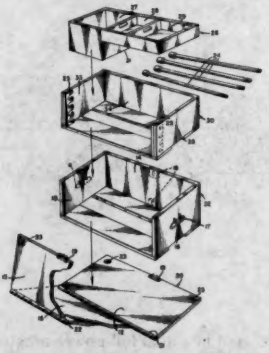
In a high-speed gas bearing structure wherein a rotary shaft is rotatably journaled by a high-pressure thin gas film, there are provided means to detect the number of revolutions of the rotary shaft, a control circuit connected to the detecting means to produce an output signal when the number of revolutions of the rotary shaft reaches a substable region beyond the first resonance point and a control valve energized by the output from the control circuit to reduce the pressure of high-pressure gas supplied to the gas bearing.

3,617,103
ROLLER
Yoshitaka Nakanishi, 12-9, 5-chome, Yawate, Ichikawa-shi, Chiba-ken, Japan
Filed Dec. 9, 1969, Ser. No. 883,380
Claims priority, application Japan, Dec. 11, 1968, Sept. 27, 1969; 43/90229, 44/76698
Int. Cl. F16c *19/26*
U.S. Cl. 308—208 **11 Claims**



A roller has a circular disk body having means defining a center aperture disposed in the center thereof and means defining a plurality of retaining groove opening into the circumference of the center aperture and extending parallel to the axis of said center aperture to define bearing roller races, each the retaining groove having a nearly major arc in section effective to retain bearing rollers in the retaining grooves; a plurality of bearing rollers disposed in said retaining grooves; and a shaft inserted through the center aperture in contact with the bearing rollers.

3,617,104
CONVERTIBLE PICNIC BOX
George W. Stadig, 331 W. Main St., Tilton, N.H.
Filed June 24, 1969, Ser. No. 835,954
Int. Cl. A47b *83/00, 85/00*
U.S. Cl. 312—241 **1 Claim**



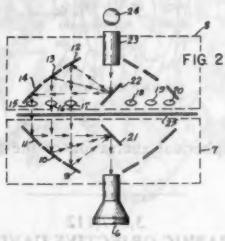
A picnic kit made up of a tabletop, which, along with the outer of two benches forms a case containing an inner bench with a rack on the bottom where table legs are stored as well as a tray for storing cooking utensils, dishes, silverware and food or the like.

3,617,105

MICROGRAPHIC PROJECTION SYSTEM

Alex Konrad, Ridgefield, N.J., assignor to Tech Laboratories, Inc., Palisades Park, N.J.

Filed Sept. 2, 1970, Ser. No. 69,020
Int. Cl. G02b 27/18
U.S. Cl. 350—6 3 Claims



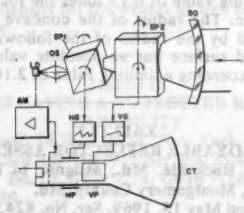
A system for projecting images from microfilm of various widths, making it possible to have two or more, or as many as 10 to 12, or even more, pictures in parallel on a strip of film. The image is then selected by electronic means whereby the location of the same will be on a coordinate electronic system that can be selected by a simple keyboard and arranged so that both the longitudinal and the transverse motions are carried on at the same time, thereby reducing the time required. The system consists of two movable scanning mirrors and a multiple set of fixed mirrors which may be lined up with the scanning mirrors, two for each of the number of pictures in transverse on the film. The scanning mirrors are automatically, and by electronic means, through appropriate coding, set for the picture desired on the transverse position, while the longitudinal picture is simultaneously selected by another set of appropriate or suitable coding.

3,617,106

HIGH-EFFICIENCY SCANNING DEVICE FOR SCANNING A FIELD IN TWO DIRECTIONS

Nils Arvid Norman Bjork, Enebyberg, Sweden, assignor to Aga Aktiebolag, Lidingo, Sweden

Filed Dec. 26, 1968, Ser. No. 786,969
Claims priority, application Sweden, Dec. 28, 1967, 17889/1967
Int. Cl. G02b 17/00
U.S. Cl. 350—7 2 Claims



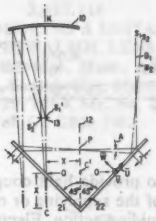
In a large-aperture scanning system for infrared light, the incoming light passes from the objective through a pair of scanning prisms rotating on axes that intersect the optical axis and are mutually perpendicular. After passage through the prisms, the light is focused by an optical system onto a pickup device. To provide good scanning efficiency, the image of the pickup device is placed inside the inner prism and the image of the scanned field formed by the objective is made to fall just outside the outer prism, the two images being substantially equally spaced from the path described by the edge of the respective prisms upon rotation.

3,617,107

THREE-MIRROR SCHMIDT TELESCOPE

Ta-Shing Chu, Lincroft, N.J., assignor to Bell Telephone Laboratories Incorporated, Murray Hill, N.J.

Filed July 28, 1969, Ser. No. 845,428
Int. Cl. G02b 17/60
U.S. Cl. 350—55 4 Claims



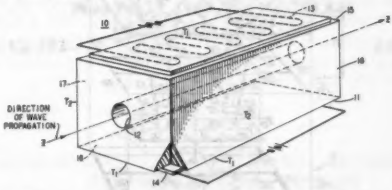
A Schmidt telescope is made using a pair of reflecting correction plates to correct for spherical aberrations and achieve wide angle, high-resolution performance without the use of refracting lenses. The all-mirror telescope is particularly advantageous for use in microwave and infrared receiving apparatus because of the expense of refractive lenses for use at these frequencies.

3,617,108

THERMAL LENS HAVING A FLUID-FILLED CYLINDRICAL APERTURE THROUGH THE CENTER OF A SQUARE-SHAPED BLOCK

Charles Fritsch, Mendham, and David J. Prager, East Hanover, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 7, 1969, Ser. No. 822,358
Int. Cl. G02b 3/12, 5/14
U.S. Cl. 350—96 6 Claims



A gas lens comprising a square block of low-thermal conductivity material having a gas-filled circular cylindrical hole extending longitudinally through its center. A cos θ temperature distribution about the periphery of the hole is obtained by establishing a temperature differential between the two pairs of opposite sides of the block. An alternating gradient focusing waveguide is obtained by cascading a plurality of such lenses such that hot and cool surfaces of adjacent units are displaced 90° with respect to each other. It is an advantage of the invention that there is no gas flow through the lens and, hence, through the waveguide. Accordingly, there is no need for flow control apparatus normally associated with gas lenses and gas waveguides.

3,617,109

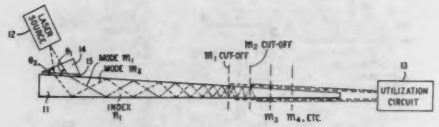
LIGHT GUIDE COUPLING AND SCANNING ARRANGEMENT

Ping K. Tien, Chatham Township, Morris County, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

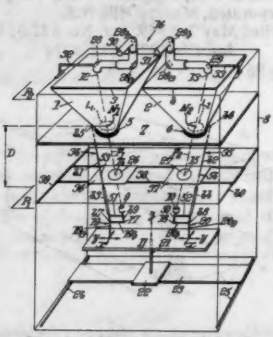
Filed Sept. 23, 1969, Ser. No. 860,383
Int. Cl. G02b 5/14
U.S. Cl. 350—96 WG 14 Claims

There is disclosed an optical guiding apparatus of the type in which a dielectric body is bounded by other dielectric

materials or free space and has only one dimension sufficiently small to produce guiding of the light. The apparatus includes means for supplying a coherent light beam in a desired mode or modes to the body and means for receiving one or more light beams from the body. The apparatus is characterized by a taper of the body to vary the one dimension sufficiently to provide light coupling between the body and at least one of the supplying or receiving means at a cutoff line for the guiding action. Electro-optic light deflection is provided within the body in some embodiments. Since different modes can be coupled out at different cutoff lines, this property is used in one embodiment to provide a two-coordinate light deflector which is useful in scanning applications.



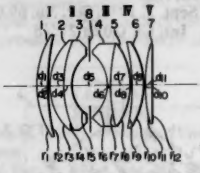
3,617,110
SPACE SIMULATORS
Bernard Louis Yves Dubuisson, Paris, France, assignor to Societe Francaise D'Optique Et De Mecanique S.F.O.M., a part interest
Filed July 8, 1969, Ser. No. 840,066
Claims priority, application Great Britain, July 8, 1968, 158,378/68
Int. Cl. G01c *11/12*
U.S. Cl. 350—136 **4 Claims**



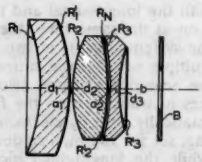
Space simulator comprising two chambers carrying a stereoscopic photopair, two light sources carried by a stand and emitting two beams projecting on the two photographs of the photopair the images of the marks, and a stereoscoping viewing device for viewing the two beams. The marks are arranged so that they can be moved exclusively in a stationary plane P_1 conjugated relatively to the lenses of the chambers with a plane P_2 corresponding to the mean position of the photopair.

3,617,111
LARGE-APERTURE PHOTOGRAPHIC LENS WITH SEVEN ELEMENTS IN FIVE GROUPS
Motoaki Kawazu, Tokyo, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan
Filed Aug. 31, 1970, Ser. No. 68,411
Claims priority, application Japan, Aug. 28, 1969, 44/67584
Int. Cl. G02b *9/60*
U.S. Cl. 350—217 **1 Claim**

A large-aperture photographic lens adapted for use as the standard lens with single-lens reflex cameras. The lens consists of seven elements in five groups and has a back focal length greater than 0.68 times the focal length of 1.0 a picture angle of 44° and an *f*-number of 1.1. The image errors, especially the spherical aberration of the higher order, are well corrected.



3,617,112
PHOTOGRAPHIC OBJECTIVE HAVING A REAR DIAPHRAGM
Joachim Eggert, Braunschweig, and Karl-Heinrich Behrens, Ufingen, both of Germany, assignors to Voigtlander, A.G.
Filed June 11, 1969, Ser. No. 832,243
Claims priority, application Switzerland, June 14, 1968, 8893/68
Int. Cl. G02b *9/12*
U.S. Cl. 350—225 **2 Claims**

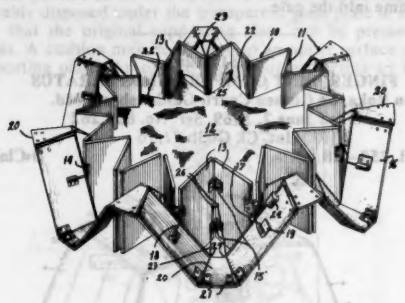


A photographic objective having a rear diaphragm. In front of the rear diaphragm there are a pair of meniscus-shaped components respectively having convex surfaces directed toward each other with one of these components being made up of a pair of individual lenses while the other is composed of a single lens. The three lenses provide the objective with a biconcave configuration. The concave front surface of the front meniscus and the opposite surface thereof have radii provided with an arithmetic sum the absolute value of which is smaller than 1.0 but no less than 0.6 times the focal length of the entire objective, while the absolute value of the difference between these radii is no smaller than o without exceeding a limiting value of 0.15 times the focal length of the entire objective. The radius of the concave front objective surface divided by the radius of the following convex forwardly directed surface has an absolute value greater than 1.10 without exceeding a limiting value of 2.10.

3,617,113
DEPLOYABLE REFLECTOR ASSEMBLY
Sigurd Hoyer, Rockville, Md., assignor to Fairchild Hiller Corporation, Montgomery County, Md.
Filed May 15, 1969, Ser. No. 824,947
Int. Cl. G02b *5/08*
U.S. Cl. 350—299 **10 Claims**

A deployable reflector assembly for electromagnetic radiation having a deployable circular T-shaped reflector ring structure attached to and surrounding a deployable reflector. The deployable circular T-shaped reflector ring has hinged folding panels, rotatable panels rotatably connected to the folding panels and wedge-shaped members that are hinged to the rotatable panels. Upon deployment, the hinged folding panels form a substantially cylindrical ring and the wedge-shaped members and rotatable panels form a substantially flat disk that is perpendicular to the central axis of the cylinder that is formed by the fully deployed folding members. The resulting deployed circular reflector ring structure has a rigid T-shaped section. As the circular reflector ring

structure is deployed, it pulls the reflector into its operational configuration. Means such as a wire connected to an electric



motor or torsion springs are provided for deploying the reflector.

3,617,114

PLEOCHROIC SPECTACLES

Howard G. Rogers, Weston, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Feb. 24, 1970, Ser. No. 13,607
Int. Cl. G02c 7/12
U.S. Cl. 351—49 7 Claims

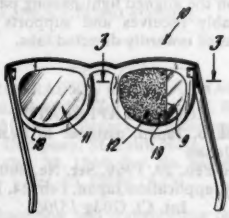
Polarized prescription spectacles are furnished with lenses ground and polished from pleochroic crystals. Pleochroic crystals are readily polished to the contours required on ophthalmic lenses. The crystal is oriented with its principal absorption axis horizontal and at right angles to the lens axis. Sunglasses can be fitted with certain pleochroic crystals to reduce solar intensity for the wearer as well as glare from terrestrial sources.

3,617,115

EYEGLASSES HAVING A CORRECTED RETROVISION CAPABILITY

Lawrence S. Pratt, 56 W. 11th St., New York, N.Y.

Filed Apr. 30, 1970, Ser. No. 33,441
Int. Cl. G02c 7/14; G02b 7/18
U.S. Cl. 351—50 1 Claim



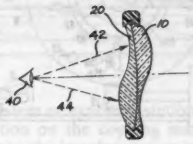
A new form of eyeglass construction is disclosed having a retrovision capability including a corrective effect. One of the eyeglass lenses is mirrored on at least part of its substantially flat forward surface so that light rays emanating from behind the wearer's head pass through the lens twice before reaching his eye. The lens may be designed to correct any defect in the vision of that eye to the greatest extent possible. Opaque material can be applied to portions of the lens to screen out extraneous images.

3,617,116

METHOD FOR PRODUCING A UNITARY COMPOSITE OPHTHALMIC LENS

Donald C. Jones, Southbridge, Mass., assignor to American Optical Corporation, Southbridge, Mass.

Filed Jan. 29, 1969, Ser. No. 794,869
Int. Cl. G02c 7/02
U.S. Cl. 351—177 1 Claim



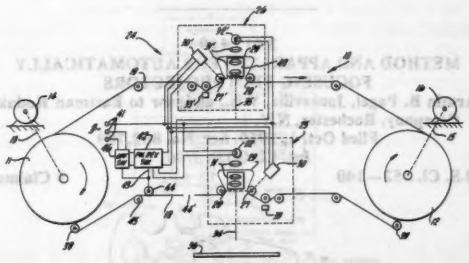
A method of producing a unitary composite ophthalmic lens, in which the lens includes two thin lens elements having a pair of outer lens surfaces, each of controlled related compound curvature, and a pair of inner adjacent flat or spherically curved surfaces in mutually adjustable engagement for providing any sphere or cylinder prescription desired within a relatively wide predetermined prescription range, and then fixedly secured.

3,617,117

MOTION PICTURE PROJECTION SYSTEM

Patrick Michael Powers, Arcadia, Calif., assignor to Bell & Howell Company, Pasadena, Calif.

Filed Feb. 3, 1969, Ser. No. 795,846
Int. Cl. G03b 23/06, 1/00
U.S. Cl. 352—27 61 Claims

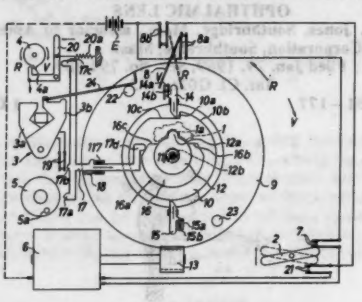


A continuously rewinding motion picture projection system in which a pair of lengths of motion picture film, which define first and second halves of a film program, are arranged in reciprocal head-to-tail relation and are transferred simultaneously back-and-forth between a pair of reels upon which the film lengths are wound in bifilar fashion. Between the reels the film lengths each pass through a projection station which includes a projection lens system directed to a display screen common to both film lengths. The projection station is operable to project upon the display screen film information carried by the film length which, at that time, moves in a forward mode through the projection station. The film lengths are in the same state at the completion of display of the program as they were when the program display was commenced.

3,617,118
MOTION-PICTURE CAMERA WITH FADING MECHANISM

Hermann Muller, Munich, Germany, assignor to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed June 12, 1970, Ser. No. 45,824
Claims priority, application Germany, June 21, 1969, G 69 24 794
Int. Cl. G03b *21/36*
U.S. Cl. 352—91 18 Claims

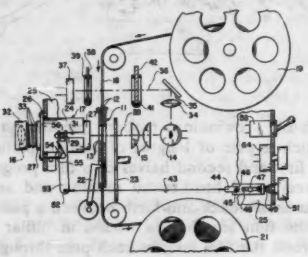


A motion-picture camera wherein exposures with fadeout and fade-in effect are produced by gradually closing and opening the diaphragm. The length of that portion of motion-picture film which is exposed with fadeout effect and thereupon with fade-in effect is determined by a first disk which can be driven by the reversible motor of the film-transporting mechanism to rotate forwardly during fadeout, thereupon rearwardly during rewinding of film which was exposed with fadeout effect, and again forwardly during fade-in. The first disk rotates a second disk during rotation in the forward direction whereby the second disk initiates the making of exposures with fadeout effect in response to first rotation of the first disk in the forward direction and the making of exposures with fade-in effect during the second rotation of the first disk in such forward direction. The second disk is automatically disengaged from the first disk or both disks are automatically disengaged from the motor upon completion of exposures with fade-in effect.

3,617,119
METHOD AND APPARATUS FOR AUTOMATICALLY FOCUSING FILM PROJECTORS

Armin B. Pagel, Janesville, Wis., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 1, 1969, Ser. No. 862,709
Int. Cl. G03b *3/00*
U.S. Cl. 352—140 9 Claims

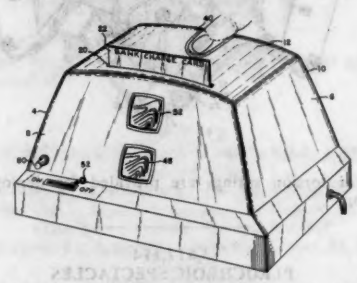


A device for automatically adjusting the focus of a film projector to compensate for film distortion caused by the sudden heating experienced by the film frame located in the projection gate as a result of absorption of radiant energy from the projection lamp. The distortion that each successive film frame will experience in the gate is predicted by measuring density characteristics of that frame before it arrives at the gate and the focus of the projector is adjusted accordingly in substantial synchronism with the movement of that frame into the gate.

3,617,120
FINGERPRINT COMPARISON APPARATUS

Stephen Roka, 30 Goshen Court, Gaithersburg, Md.

Filed June 2, 1969, Ser. No. 829,262
Int. Cl. G03b *21/26*
U.S. Cl. 353—28 3 Claims

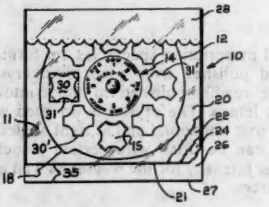


A device for verifying the identity of a person presenting a credit card or other document bearing a fingerprint, comprising a means for presenting in juxtaposed relation a view of the printed fingerprint and a view of the corresponding finger of the person, thereby permitting quick comparison. Photographic means may be optionally provided for recording each fingerprint or actual finger or both.

3,617,121
SELECTIVE IMAGE PRODUCING APPARATUS FOR USE WITH A PROJECTOR

Marilyn M. Culp, P. O. Box 5455, Midland, Tex.

Filed Oct. 14, 1969, Ser. No. 866,184
Int. Cl. G03b *21/00*, *23/10*
U.S. Cl. 353—120 4 Claims



Apparatus for use in combination with a projector for selectively projecting the image of one of a plurality of small transparencies from the projector to an image-receiving surface. The apparatus is in the form of a file folder having spaced-apart light-passing passageways therein, and having a disk rotatably supported by the file folder, with the disk having a plurality of circumferentially disposed windows therein. Rotation of the disk enables any one of the windows to be superimposed upon the aligned light-passing passageways. Each window removably receives and supports a transparency therein by means of inwardly directed tabs.

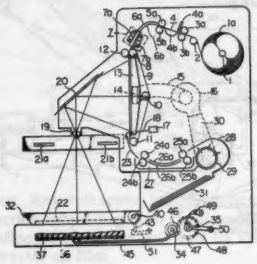
3,617,122
COPYING APPARATUS

Akira Saito, Tokyo, Japan, assignor to Iwatsu Electric Co., Ltd., Tokyo, Japan

Filed Feb. 20, 1969, Ser. No. 800,861
Claims priority, application Japan, Feb. 24, 1968, 43/13,431
Int. Cl. G03g *15/00*
U.S. Cl. 355—11 3 Claims

Disclosed herein is an improved copying apparatus provided with an improved holding device. A typical device for

holding the original, according to the invention, comprises a rectangular frame and a transparent glass plate disposed at a bottom portion of the frame, and an original supporting plate movably disposed under the transparent glass plate in such a way that the original supporting plate can be pressed upwards. A cushion may be secured to an upper surface of the supporting plate. An optical means for projecting an image



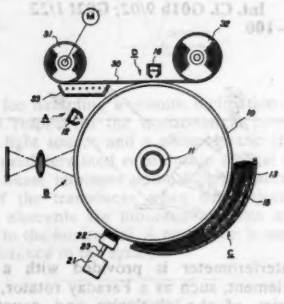
upon a copy paper, which is held in a stational condition during the copying operation, is disposed above the glass plate so that the original can be placed on the supporting plate in a condition wherein it faces upward. Thus, when a certain number of copies are required to be made from a series of originals in a book form, the pages can be turned by lowering the supporting plate without taking off the originals from the supporting plate.

3,617,123

XEROGRAPHIC CLEANING APPARATUS

William C. Emerson, Rochester, N.Y., assignor to Xerox Corporation, Rochester, N.Y.

Filed Feb. 6, 1969, Ser. No. 796,960
Int. Cl. G03g *15/08, 15/22*
U.S. Cl. 355—15 **3 Claims**



Method and apparatus for cleaning residual toner material from a photoconductive surface in automatic xerographic processing apparatus in which the photoconductive surface is developed and cleaned simultaneously at a single processing station. A brush mounted at the entrance to the development-cleaning station which is vibrated to uniformly distribute residual toner over the entire area of the photoconductive surface to effect efficient cleaning.

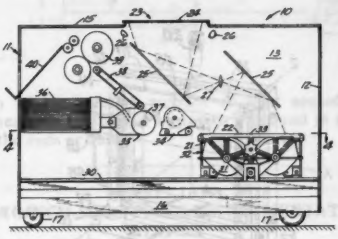
3,617,124

ELECTROGRAPHIC COPYING MACHINE

Orville C. Haugen, Bloomington, and Emil J. Kvaal, North St. Paul, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 20, 1969, Ser. No. 867,496
Int. Cl. G03g *15/00*
U.S. Cl. 355—16 **7 Claims**

A system for handling and transporting the intermediate web in an electrographic copying machine which utilizes an intermediate web to produce copies of graphic intelligence. The system comprises a cartridge formed of two molded shells which contain a supply of intermediate web wound between two rollers. The rollers extend beyond the sides of the cartridge and a section of the web between the rollers is disposed externally to the cartridge. The cartridge is removably mounted on a movable carriage having a flat conductive peripheral support area supporting said external web section. Means is provided to transport the carriage thus moving the supported section of web in proper sequence



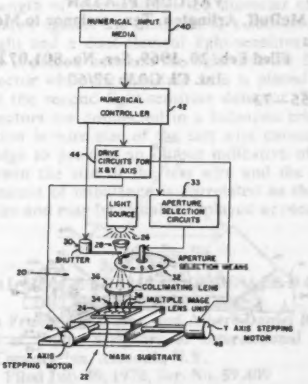
from an imaging system or exposure station to a development and a transfer station on the copying machine and to then return the carriage to the imaging station in order to produce the desired copies. Drive means is provided on the machine to change the section of web disposed externally to the cartridge as is needed in producing subsequent copies. The web change is accomplished by winding the web from one roller onto the other.

3,617,125

AUTOMATIC GENERATION OF MICROSCOPIC PATTERNS IN MULTIPLICITY AT FINAL SIZE

Mark D. Sobottke, and Clifford W. Kruer, both of Dayton, Ohio, assignors to The National Cash Register Company, Dayton, Ohio

Filed Apr. 24, 1969, Ser. No. 818,997
Int. Cl. G03b *27/44*
U.S. Cl. 355—46 **8 Claims**



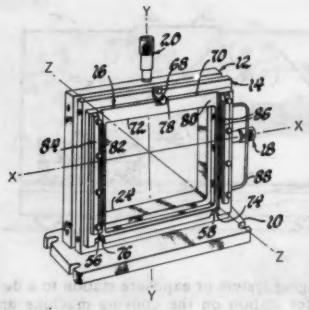
An apparatus for automatically generating geometric patterns (like microcircuit photomasks) in multiplicity at final size. The apparatus includes an indexing table for supporting photosensitive media and for indexing the media along coordinate directions at right angles to each other. The apparatus also includes an optical imaging system for directing a shaped pattern image onto said media. The imaging system includes an aperture plate for shaping the image; a multiple lens unit for producing a plurality of images corresponding to said pattern image on said media; and a collimator lens positioned between the aperture plate and the multiple-lens unit. The pattern image is simultaneously repeated on the media with a high degree of accuracy. A numerical controller, which is tape fed, is used to control the operation of the apparatus.

3,617,126

REPOSITIONING APPARATUS FOR PHOTOGRAPHIC PLATES

Donald E. Gillespie, Ann Arbor, Mich., assignor to Jodon Engineering Associates, Ann Arbor, Mich.

Filed Nov. 10, 1969, Ser. No. 875,274
Int. Cl. G03b 27/58; G04d 7/00
U.S. Cl. 355—72 8 Claims



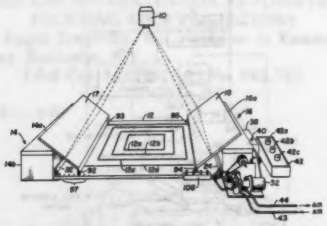
A photographic plate holder for use in holography is disclosed. The plate holder includes apparatus for precise repositioning of the photographic plate after it has been removed for processing of a hologram recorded thereon. The photographic plate is retained in a plate carriage which in turn is removably supported in a kinematically stable mount on an adjustable member. The adjustable member is disposed upon a support member by a spring suspension system and is adjustable along X and Y-axes by means of a micrometer screw-spring displacement system which affords a high ratio of displacement reduction for positional adjustment in a reference plane parallel to the X and -axes.

3,617,127

PHOTOGRAPHIC MATERIAL TRANSPORT WITH VACUUM PLATEN

Rubert J. McDuff, Arlington, Tex., assignor to Mobil Oil Corporation

Filed Feb. 20, 1969, Ser. No. 801,072
Int. Cl. G03b 27/60
U.S. Cl. 355—73 15 Claims



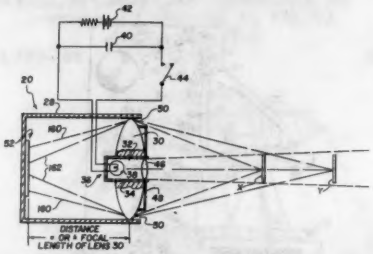
The specification discloses an automatic machine for handling bulk roll form photographic material during manufacture of photographic enlargements. The machine dispenses the photographic material in the objective plane of an enlarger, holds the material flat for an exposure, and then transports the material to the position for the next exposure. A novel platen and pneumatic system provides for vacuum holddown of the photographic material for an exposure and then provides an air cushion on which the photographic material rides as it is being advanced to the position for the next exposure. Adjustment of the length of material dispensed for each exposure is easily made by means of an electronic timer unit.

3,617,128

AUTOMATIC RANGEFINDER MEANS

Donald M. Harvey, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 28, 1968, Ser. No. 771,209
Int. Cl. G01c 3/08
U.S. Cl. 356—4 12 Claims



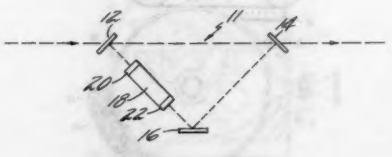
This disclosure relates to an automatic rangefinder utilizing refracted light from a subject to ascertain range distance. Light is transmitted toward the subject, and the refracted light is received by an optical system suitably masked so as to admit the refracted light only around peripheral portions. Photosensitive materials are arranged at the image plane of the optical system, the photosensitive materials having a predetermined geometrical configuration wherein predetermined loci are functions of range distance. The discrete locus delineated by the refracted light at the image plane is then identified to determine range distance.

3,617,129

INTERFEROMETRIC OPTICAL ISOLATOR

Michael L. Skolnick, Monroe, Conn., assignor to United Aircraft Corporation, East Hartford, Conn.

Filed Nov. 10, 1969, Ser. No. 875,238
Int. Cl. G01b 9/02; G02f 1/22
U.S. Cl. 356—100 9 Claims



A ring interferometer is provided with a directional anisotropic element, such as a Faraday rotator, to separate the frequencies of the clockwise and counterclockwise travelling waves therein, one of which is chosen as the resonant frequency. The result is that light entering at the resonant frequency through one of the entrance ports of the resulting four-port optical circulator will have to be readily transmitted through the device, while light entering the opposite entrance port at the same frequency will be rejected significantly; the device therefore acts as an optical isolator having high transmission of a forwardly travelling wave and high rejection of a backwardly travelling wave.

3,617,130

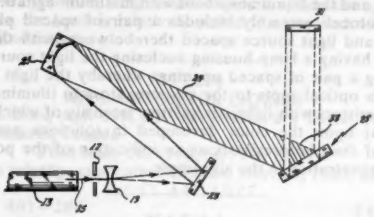
SIMPLIFIED SCHLIEREN SYSTEM

Joseph G. Kelley, Wayland, Mass., and Robert A. Hargreaves, Nashua, Md., assignors to The United States of America as represented by the Air Force

Filed Dec. 10, 1969, Ser. No. 883,710
Int. Cl. G01b 9/02; G01n 21/46
U.S. Cl. 356—107 4 Claims

A beam of coherent light is expanded and reparallelized by a single lens and a parabolic mirror. The beam then passes

through the test region, which may be of any convenient size and impinges on a back surface mirror at 45 degrees. About 10 percent of the light is reflected from the front surface of the glass. This is slightly offset from the image reflected from



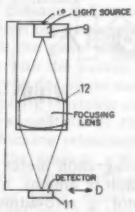
the rear surface. Any refractive index gradients perpendicular to the direction of propagation then create fringes in the overlapping reflected images which may be visually observed or recorded directly on film.

3,617,131

SYSTEM FOR DETECTION OF MINUTE INCLINATION

Hiromi Taguchi, Tokyo, Japan, assignor to Konishiroku Photo Industry Co., Ltd.

Filed July 24, 1969, Ser. No. 844,398
Claims priority, application Japan, July 24, 1968, Dec. 25, 1968; 43/51820, 43/94483
Int. Cl. G01b *11/26*; G01c *9/06*
U.S. Cl. 356—152 5 Claims



A system for detecting a minute inclination of an object surface with respect to the horizontal is provided, which comprises a light source and a photoelectric transducer arranged in a predetermined relationship so that a spotlike or slitlike light beam impinges upon different areas of varying sensitivity of the transducer when the object surface on which these elements are mounted includes an inclination with respect to the horizontal. A pendulum is used to provide a vertical reference to the system.

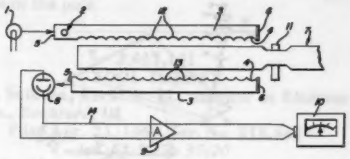
3,617,132

APPARATUS UTILIZING LIGHT-CONDUCTING RODS WITH LENSES FOR PROVIDING A REMOTE INDICATION OF THE AMOUNT OF MAGNETIC RECORDING TAPE ON A REEL

Robert C. Bell, East Setauket, N.Y., assignor to Beltronix System, Inc.

Filed Aug. 5, 1969, Ser. No. 849,282
Int. Cl. G01b *11/00*, *11/04*, *11/10*
U.S. Cl. 356—156 2 Claims

Measuring device including a pair of spaced-apart, normally light-transmitting rods or bars, each having a light-reflecting coating at one end and throughout a major portion of their respective longitudinal surface areas, thereby defining relatively narrow longitudinal light-transmitting areas in each rod or bar facing the like area in the other rod or bar; means for producing and transmitting light into the uncoated end of the first rod or bar; and means sensing the relative amount of light reflected and transmitted out of the uncoated end of the second rod or bar. The device is especially adaptable for use as a remote indicating footage meter for reels of magnetic recording tape, magnetic data-processing tape or the like located between the two rods or bars, by electrically connecting the light sensing means, preferably through an amplifier, to a remote meter or the like which gives a visual



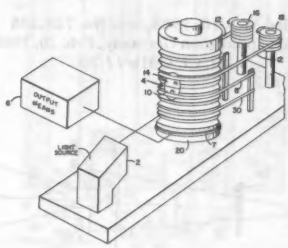
indication of the relative amount of light sensed by the sensing means as the tape is wound or unwound in the space between the rods or bars.

3,617,133

MICROINCH-MEASURING INSTRUMENTATION SYSTEM

Carman H. Gibson, Rte. 4, Fayetteville, Tenn.

Filed May 20, 1970, Ser. No. 39,600
Int. Cl. G01b *11/08*, *11/10*
U.S. Cl. 356—159 3 Claims



Device for microinch measurement of the diameter of a continuous length of wire wherein the diameter of the test wire is compared against the diameter of a standard wire by utilizing a light and a dual-element light-sensitive detector. The test wire is placed between the light and the first light-sensitive detector while the standard wire is placed between the light and the second light-sensitive detectors are connected in a balanced bridge such that a deviation in wire size of the test wire causes the unbalanced bridge to provide an output indicative of the difference between the size of the test wire and the standard wire. The amount of imbalance is correlated to the dimension of the wire and may be visually displayed or recorded.

3,617,134

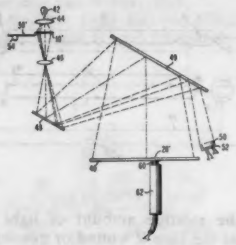
OPTICAL IMAGE FRAME COORDINATE DATA DETERMINING SYSTEM

Donald Irwin Frush, Los Gatos, and Albert Daniel Rizzi, San Jose, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed July 30, 1970, Ser. No. 59,409
Int. Cl. G01g *11/00*
U.S. Cl. 356—162 10 Claims

The use of film projection and like optical display devices in conjunction with digital computer and data-processing systems is enhanced by a rectangular, or X–Y, coordinate determining system providing a completely unobstructed view of the display by means of a mask element moved across the film frame bearing the information virtually in the plane of the frame. A pair of photoresponsive elements are arranged in the display device for receiving light from a pair of light-transmitting spots correspondingly arranged parallel to an edge of each film frame. The mask element is shaped to interrupt the light passing between the spots and the photoresponsive cells and a photosensitive probe placed on the display at a point at which the data coordinates are to be determined. The mask element has one portion interrupting

the light periodically for advancing X- and Y-counter as the mask element is moved across the frame up to the probe



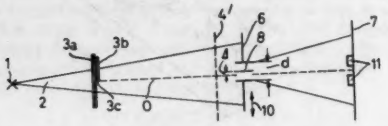
under control of circuitry comprising conventional electronic gating circuits and latches. Cartesian coordinates are derived directly from the X- and Y-coordinate data counters.

3,617,135

OPTICAL ALIGNMENT METHOD AND ARRANGEMENT FOR PRACTICING THE METHOD

Hans Dieter Betz, Mannheim, Germany, assignor to Carl Zeiss-Stiftung, Heidenheim on the Brenz, Wurttemberg, Germany

Filed May 10, 1968, Ser. No. 728,208
Claims priority, application Germany, Feb. 20, 1968, B 96728
Int. Cl. G01b 11/26
U.S. Cl. 356—172 4 Claims



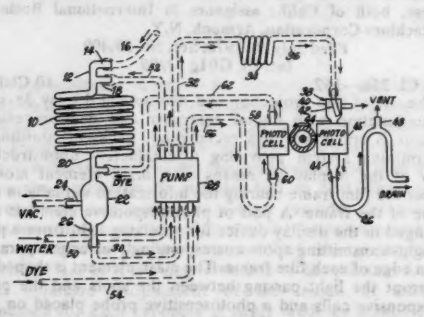
A method and arrangement for optical alignment of spatially separated objects in which a laser beam of substantially coherent radiation has disposed therein a phase plate producing a minimum of intensity, a diffraction diaphragm representing the object to be aligned and an observation screen on which appear the characteristics of the diffraction pattern produced by the diaphragm. Photoelectric scanning elements may be arranged in the plane of said observation screen for detecting said diffraction pattern.

3,617,136

COLORIMETER AND ELEMENTS THEREFOR

Norman A. Lyshkow, Chicago, Ill., assignor to Pollution Monitors, Inc., Chicago, Ill.

Filed June 15, 1970, Ser. No. 46,308
Int. Cl. G01j 3/46; G01n 31/00
U.S. Cl. 356—180 4 Claims



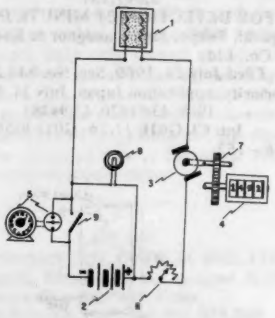
This invention is addressed to a new and improved colorimeter for determining the concentration of gaseous pollutants in air and to improved scrubber and photocell assemblies for use with such colorimeters, wherein the scrubber includes a helical coil into which an air sample is drawn and admixed with a liquid absorbent whereby the liquid flows gravitationally through the coil in the form of wave fronts to provide complete contact between the air sample and the liquid absorbent with minimum agitation, and the photocell assembly includes a pair of spaced photoresistors and light source spaced therebetween, with the light source having a lamp housing enclosing the light source and defining a pair of spaced openings whereby the light source projects optical spots to the photoresistors to illuminate the photoresistors with light, the relative intensity of which is dependent upon the color developed in solutions passed in front of the photoresistors as an indication of the pollutant gas concentration in the air sample.

3,617,137

LUMEN-HOUR INTEGRATION METERS

Siegfried S. Meyers, Harrisonburg, Va., assignor to Madison College Foundation, Inc., Harrisonburg, Va.

Filed May 16, 1969, Ser. No. 825,286
Int. Cl. G01j 1/46
U.S. Cl. 356—215 4 Claims



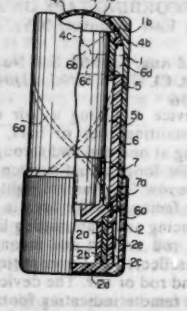
A lumen-hour integration meter circuit for registering intensity of illumination in lumens, which includes a miniature direct current motor, a zero-adjusting rheostat, and either self-generating photovoltaic solar cell means or a switch and photoconductive cell, all connected in a series loop, together with a digital readout counter coupled to the motor to be driven by the motor, whereby the counter will register in units of lumen hours.

3,617,138

COSMETIC APPLICATOR

Kiyoshi Fukui, Saitama-ken, Japan, assignor to Shiseido Co., Ltd., Tokyo, Japan

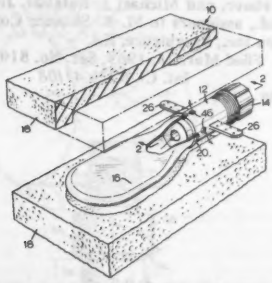
Filed May 21, 1970, Ser. No. 39,295
Int. Cl. A45d 40/06
U.S. Cl. 401—59 5 Claims



A capless cosmetic applicator provided with a cylindrical casing and a knob turnably and telescopically engaged with

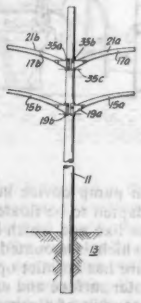
the cylindrical casing. The tip portion of the cylindrical casing is opened and provided with a pair of shutter pieces swingably engaged with an inside wall thereof so that the shutter pieces are opened when a solid cosmetic contained is used or alternately closed when the applicator is not used. The opening or closing motion of the shutter pieces is operated by an actuating means disposed within the applicator when the knob is relatively pulled from or pushed in the cylindrical casing.

3,617,139
APPLICATOR FOR LIQUIDS
John C. Ross, Apt. 610, 52 Thorncliffe Park Drive, Toronto 17, Ontario, Canada
Filed Mar. 16, 1970, Ser. No. 19,919
Claims priority, application Canada, Mar. 20, 1969, 46,249
Int. Cl. A47l *13/17*
U.S. Cl. 401—206 **4 Claims**



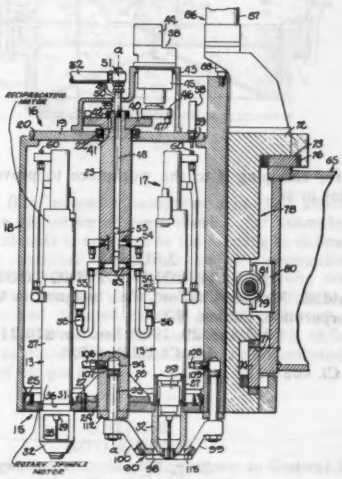
A flexible impervious gland is connected to a cylindrical body and both the gland and body are sandwiched between two halves of a sponge. A passage is formed within the body and a valve is mounted within the passage. An aperture communicates the passage with the gland and a second aperture communicates the passage with the outside wall of the body. The gland serves as a reservoir for liquid such as soapy water. In one embodiment, a manually rotatable cap or head is connected to the valve. Upon rotation of the cap, the valve moves into and out of a blocking relationship with the aperture which communicates the passage with the outside wall of the body. When the valve is not blocking the aperture, the gland may be squeezed to force liquid from the gland, through the passage and out through the aperture to the sponge. In a second embodiment, the valve is spring loaded and normally blocks the aperture which communicates the passage with the gland. A cap is connected to the valve and when the cap is pressed in a direction opposed to the bias of the spring, the valve is opened. The gland may be squeezed to force the liquid from the gland out onto the sponge.

3,617,140
METHOD AND APPARATUS FOR PIERCING A POLE TO ACCOMMODATE HARDWARE-MOLDING FASTENERS
Richard L. Gates, Bethel Park, Pa., assignor to Koppers Company, Inc.
Filed June 30, 1969, Ser. No. 837,412
Int. Cl. B23b *49/02*
U.S. Cl. 408—1 **11 Claims**



A method and apparatus for piercing poles including a perforated template used to locate the centers of the mounting holes; an auger-guiding jig that is positionable on the pole and is alignable with the hole markings includes adjustable auger-guiding blocks which are releasably securable to the jig so as to align with an axis connecting hole markings on opposite sides of the pole.

3,617,141
TOOL TURRET
Robert W. Sullivan, Rockton, Ill., assignor to Ekstrom Carlson & Co., Rockford, Ill.
Filed Apr. 23, 1969, Ser. No. 818,646
Int. Cl. B23b *39/20*
U.S. Cl. 408—35 **4 Claims**

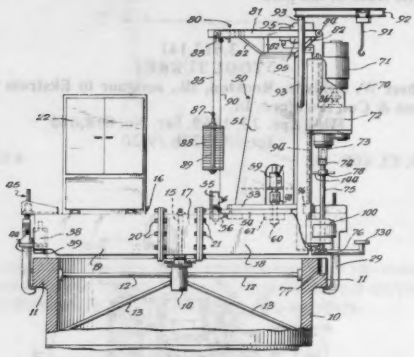


A toolholder including a tool turret mounted to rotate about its central vertical axis and the turret mounts a number of self-contained tool units for rotation with it. The tool units are spaced angularly around the central axis, nd each tool unit is spaced the same predetermined radial distance from the central axis. Positioned nonrotatably on the toolholder is an actuator which creates an active tool position in which a tool unit can be activated, and the solenoid is positioned so that the active tool position is created at a distance from the central axis equal to the predetermined radial distance. To be activated, a selected tool unit rotates with the turret and into the active tool position. The toolholder can be mounted in a gantry-type machine tool base over a bed on which a workpiece is supported and, with this arrangement, the active tool position can be moved relative to the workpiece from location to location. A pneumatically operated holddown located adjacent the active tool position performs the double function of holding the workpiece steady so that it can be acted on in an accurate manner by the selected tool unit and of directing jets of air at the top surface of the workpiece to clean it off prior to action by the selected tool unit.

3,617,142
PORTABLE MACHINE TOOL FOR VERTICAL DRILLING, THREADING AND THE LIKE
Gerald De Wane, Chicago; Chester A. Harris, Jr., Western Springs, and Harold L. Gebhard, Chicago, all of Ill., assignors to Chicago Bridge & Iron Company, Oak Brook, Ill.
Filed Oct. 3, 1968, Ser. No. 764,824
Int. Cl. B23b *45/14*
U.S. Cl. 408—103 **15 Claims**

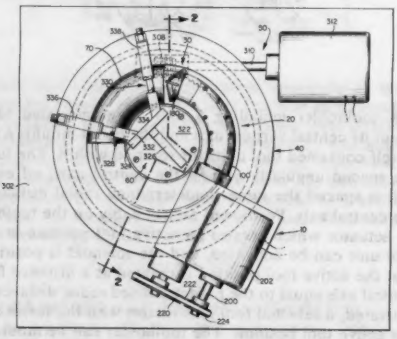
Disclosed is a portable machine tool for drilling, reaming, tapping and chamfering, spot facing and grinding large diameter deep vertical holes in metal with means for removing the heat and chips generated from drilling, reaming or

tapping the holes as they are produced. The machine has means for aligning or levelling it relative to the workpiece



and for clamping it to the workpiece to prevent lifting or shifting in use.

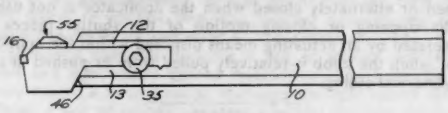
3,617,143
ARCUATE HOLE-CUTTING TOOL
Harold K. McKee, Chalfont, Pa., assignor to Custom Alloy Corporation, Califon, N.J.
Filed Apr. 29, 1969, Ser. No. 820,212
Int. Cl. B23b *41/00*
U.S. Cl. 408—127 **1 Claim**



A cutting tool for cutting along an annular path comprises a cutting head, a drive motor and speed reducer unit including an output shaft, and a fixed-angle rotating joint transmission means mounted in an arcuate member and connected to one end to the output shaft and at the other end to the cutting head for transmitting power thereto about a severe arc. The tool and power source are mounted on a rotatable table so that the tool can be fed into a stationary workpiece.

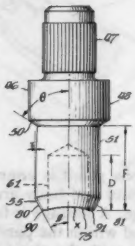
3,617,144
ADJUSTABLE BORING BAR
Eldo K. Koppelmann, and William S. Holloway, both of Cumberland, R.I., assignors to Madison Industries, Inc.
Filed July 24, 1969, Ser. No. 844,346
Int. Cl. B23b *29/034*
U.S. Cl. 408—187 **2 Claims**

A two-part adjustable boring bar assembly consisting of a shank and an adjustable head, the adjustable head being received in an end slot of the boring bar and having keyway engagement with the slot to maintain the proper attitude of the adjustable head with the bar. An adjusting screw is provided and captured in one of the parts, the threads of which



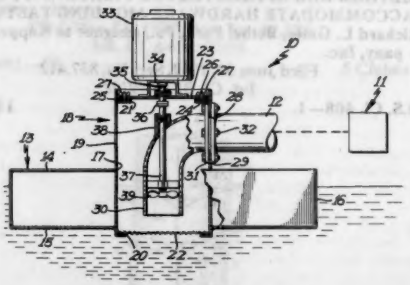
engage the other of the parts to traverse the head transverse of the boring bar.

3,617,145
COUPON-RETAINING PIPE TAPPING PUNCHES
Blase G. Celmer, and Michael J. Rafalski, Jr., both of South Bend, Ind., assignors to M. B. Skinner Company, Division of Textron Inc., Providence, R.I.
Filed Mar. 26, 1969, Ser. No. 810,660
Int. Cl. B23b *41/08*
U.S. Cl. 408—204 **10 Claims**



A substantially cylindrical or tubular, longitudinally extending, coupon-retaining, pipe-tapping punch having the characteristics described below, and having among other things, a coupon-retaining bore and a tapping portion having tapping edges for forming and enlarging an opening in a metal pipe.

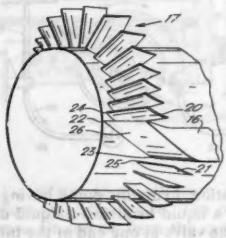
3,617,146
FLOATATION PUMP DEVICE
Theodore F. Garland, Fargo, N. Dak., assignor to Garland Manufacturing Company, Crosby, Minn.
Filed Oct. 20, 1969, Ser. No. 867,812
Int. Cl. F01d *25/28*
U.S. Cl. 415—7 **2 Claims**



A shallow flotation pump device includes a hollow flotation tank which is adapted to be floated in a source of water such as a pond or the like and which has a centrally located opening therein in which is mounted a chamber structure. The chamber structure has an inlet opening therein which is located below the water surface and an outlet opening which is connected to the conduit of a primary suction pump. The floating pump device permits water to be pumped from ad-

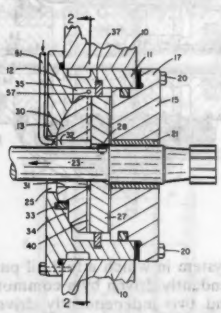
jacent the water surface into the conduit without the creation of whirlpools or without the danger of air entering the suction line.

3,617,147
FLUID FLOW MACHINE
Stephen Lawrence Bragg, Derby, England, assignor to Rolls-Royce Limited, Derby, England
Filed Oct. 1, 1969, Ser. No. 862,779
Claims priority, application Great Britain, Oct. 2, 1968, 46740/68
Int. Cl. F01d *1/04*
U.S. Cl. 415—77 8 Claims



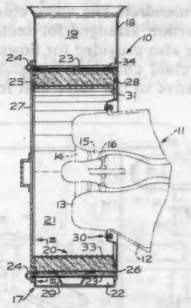
The invention concerns a fluid flow machine provided with an annular duct having at least one aerofoil-shaped strut which extends across the duct, the said strut being axially staggered with respect to and, having on angularly opposite sides thereof axially staggered angularly spaced-apart stator vanes which, reduce the static pressure field set up by the strut.

3,617,148
THRUST BEARING FOR REFRIGERATION COMPRESSOR
James W. Endress, Syracuse, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.
Filed May 18, 1970, Ser. No. 38,424
Int. Cl. F01d *1/18*; F03b *1/00, 3/00*
U.S. Cl. 415—90 10 Claims



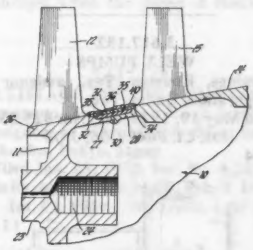
The thrust bearing disc is formed in the face side engaging the thrust collar with grooves extending outwardly from the shaft to an annular enclosed space. An oil and refrigerant mixture is supplied to the inner ends of the grooves. The grooved bearing disc in cooperation with the rotating thrust collar serves as a pump, pressurizing the mixture to provide forced lubrication between the collar and the thrust bearing disc and to prevent flashing of the refrigerant from the oil.

3,617,149
AIR INLET FILTER ASSEMBLY
Myron R. Gibson, Edelstein, Ill., assignor to Caterpiller Tractor Co., Peoria, Ill.
Filed Oct. 6, 1969, Ser. No. 863,909
Int. Cl. F04b *39/16*
U.S. Cl. 415—121 5 Claims



An air inlet filter assembly comprises a housing attached adjacent to the air intake of a gas turbine, for example. A cylindrical air cleaner is mounted in the housing to define an annular outer chamber thereabout which communicates directly with an inlet cowl. Ambient air exhibiting nonuniform pressure characteristics is circulated through the outer chamber and directed radially inwardly through the filter whereby the pressure characteristics of such airflows are rendered substantially uniform when communicated to the air intake of the gas turbine.

3,617,150
ROTOR DRUM
Joseph A. Wagle, Indianapolis, Ind., assignor to General Motors Corporation, Detroit, Mich.
Filed June 1, 1970, Ser. No. 42,350
Int. Cl. F01d *5/06*
U.S. Cl. 416—198 2 Claims

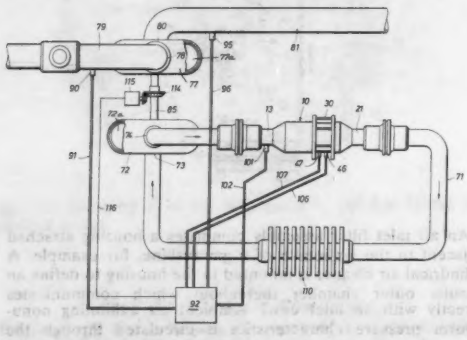


A drum-type rotor for an axial flow compressor comprises a number of abutting annular sections (wheels and rings) bearing the rotor blades of the compressor. The sections are piloted together by overlapping interfitted flanges and are secured together by a polymer adhesive composition which is cured in place between the annular members and a containing ring spaced from them to define a cavity for the adhesive.

3,617,151
FLUID FLOW CONTROLLING VALVE AND SYSTEM
Elva J. Scroggins, Lafayette, La., assignor to Drilling Well Control, Inc., Houston, Tex.
Filed Aug. 18, 1969, Ser. No. 850,895
Int. Cl. F04b *49/00*
U.S. Cl. 417—18 3 Claims

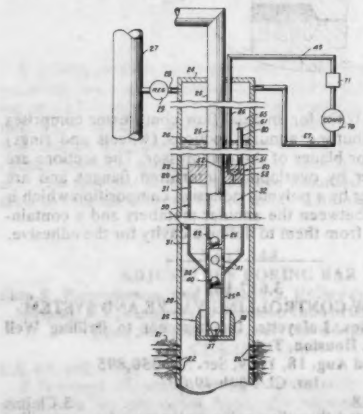
A fluid-actuated throttling valve and system for controlling fluid flow through a conduit by operation of the valve. The

valve is characterized by having a housing with an inlet and outlet arranged for fluid to flow therethrough and having a valve seat therein for controlling fluid flow therethrough. A mandrel is mounted in the housing and a valve closure assembly is mounted on the mandrel for axial movement thereon, with the mandrel extending through both ends of the valve closure assembly. The mandrel has an enlarged annular portion forming a fixed piston whereby an upstream and a downstream chamber is formed between the closure assembly and the mandrel. The valve closure assembly also supports a ram portion arranged for seating with the valve seat and means are also provided for flowing another fluid to and from the aforesaid chambers to axially move the valve closure means relative to the valve seat for controlling fluid



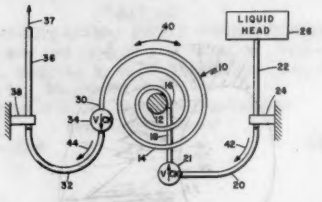
passage through the housing. The system of this invention includes a pair of rotary housings, each of which has an inlet and outlet arranged for flowing fluid therethrough. A rotary impeller wheel is mounted for rotation in each of the housings, with the rate of rotation being related to the flow of fluid through the housings. Coupling means are provided between the rotors for transmitting rotational forces therebetween. Means are included for connecting the inlet and outlet of one of the rotor housings in a first conduit, and a closed loop conduit is connected with the inlet and outlet of the other of said rotor housings. A valve such as that described above is interposed in the closed loop conduit for controlling the flow of the controlled fluid therethrough, thereby controlling the rate of speed of rotation of the impeller wheels and the flow of fluid through the first conduit.

3,617,152
WELL PUMPS
Leslie L. Cummings, Houston, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.
Filed May 19, 1969, Ser. No. 825,538
Int. Cl. F04f *1/06, 3/00*
U.S. Cl. 417—54 **55 Claims**



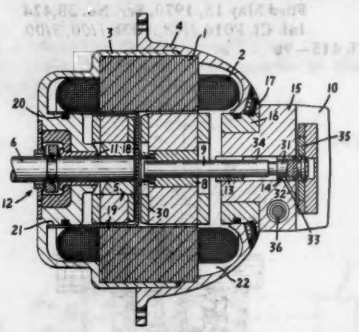
Methods of and means for the artificial lifting of well fluids; and, more particularly an automatic well pump utilizing compressed power air or gas to displace well production fluids from the well bore to the earth's surface, and systems and methods utilizing such pumps wherein the power gas exhausted from the pump is collected in a chamber at a desired predetermined superatmospheric pressure to reduce the energy required to compress the same for reuse in the pump.

3,617,153
HYDRAULIC CYCLE PUMP
Robert C. Mowry, 3672 Princeton Ave., San Diego, Calif.
Filed Feb. 2, 1970, Ser. No. 7,527
Int. Cl. F04f *7/00*
U.S. Cl. 417—241 **8 Claims**



A kinetic acceleration, hydraulic pump having a spiral tube connected between a liquid head and a liquid discharge line with a one-way intake valve at one end of the tube and a one-way output valve at the other end of the tube, which spiral tube is rotated circumferentially with a reciprocating, accelerating movement, the acceleration of which moves the fluid through the tube from the liquid head to the discharge line by inertial displacement of liquid in the tube.

3,617,154
OIL BURNER SYSTEM WITH MOTOR-DRIVEN PUMP CONTROLLING BYPASS VALVE
Kyrre Guttorm Sjotun, Nordborg, Denmark, assignor to Danfoss A/S, Nordborg, Denmark
Filed May 9, 1968, Ser. No. 727,836
Claims priority, application Germany, May 9, 1967, D 53036
Int. Cl. F04b *13/09;* **B05b** *9/00*
U.S. Cl. 417—299 **1 Claim**



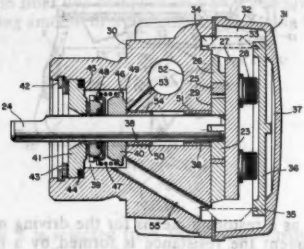
An oil burner system in which a fuel oil pump and the air blower are independently driven by a common motor having a single stator and two independently driven rotors. One rotor is connected to the pump and the other to the air blower so that the inertia of the pump drive is reduced and it comes to a stop quicker. The rotor for driving the pump is disposed in an oil-filled compartment so that it is damped. The system is provided with a bypass valve connecting the discharge side of the pump with its suction controlled by the motor shaft which is biased to open the bypass valve when the motor is in a deenergized condition. When the motor is energized the shaft is attracted axially electromagnetically and it closes the bypass valve. When the motor is deenergized it opens the bypass valve, the pump stops relatively quickly and the blower continues to blow air to ensure burning of all oil supplied from the burner and avoid coking on the burner and elsewhere.

3,617,155

OIL-PUMP WITH A PRESSURE-REGULATING VALVE CONNECTED ON THE OUTLET SIDE

Gunnar Lyshoj Hansen, and Jorgen Hartvig Petersen, both of Nordborg, Denmark, assignors to Damfoss A/S, Nordborg, Denmark

Filed Aug. 5, 1969, Ser. No. 847,582
Claims priority, application Germany, Sept. 17, 1968, P 17 28 245.0
Int. Cl. F04b *49/08*
U.S. Cl. 417—310 3 Claims



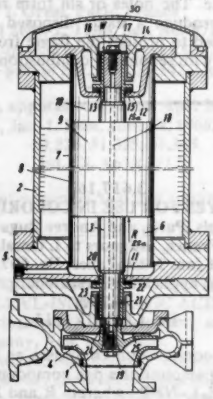
The invention relates to an oil-pump assembly which includes a pressure-regulating valve. The object of the invention is to remove air and oil from the spring chamber of the pressure-regulating valve. The shaft seal chamber has a slide-ring seal attached to the pump shaft which operates as a check valve. The pump casing is formed so that the shaft seal chamber has fluid communication with the shaft bore, the suction inlet of the pump and the spring chamber of the regulating valve. The shaft seal functions as a check valve which opens when pressurized oil from the pump discharge flows outwardly through the shaft bore. The mouth of the passage leading to the spring chamber of the pressure-regulating valve is opened or closed depending on the axial position of the shaft seal and when the mouth is open, air and oil is drawn from the regulating valve spring chamber to the suction inlet of the pump through the shaft seal chamber.

3,617,156

COUNTERBALANCED HYDRAULIC MOTOR AND PUMP UNIT

Otto Schiele, Neustadt; Adolf Kratzer, Nurnberg, and Helmut Zilling, Nurnberg, all of Germany, assignors to Klein, Schanzlin & Becker Aktiengesellschaft, Frankenthal Pfalz, Germany

Filed Dec. 17, 1969, Ser. No. 885,730
Claims priority, application Germany, Dec. 17, 1968, P 18 15 088.4
Int. Cl. F04b *35/00*; F01d *3/00*; F04b *17/00*
U.S. Cl. 417—365 11 Claims



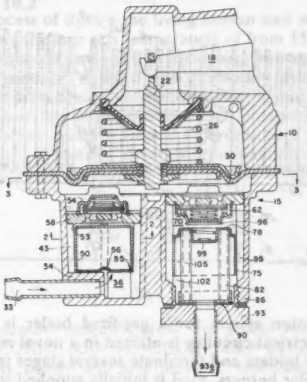
A motor and pump unit has a motor rotor and a pump rotor connected by a shaft whose end portions pass through openings in the end walls of a casing. OUtside of the end walls, the shaft has flanges forming axial gaps with the end walls so that pressure fluid flowing through the gaps counterbalances the motor rotor.

3,617,157

FUEL PUMPS WITH REVERSIBLE AIR DOME AND FILTER

Claude F. Phillips, Fairfield, Ill., assignor to Airtex Products Division of United Industrial Syndicate, Inc., New York, N.Y.

Filed June 24, 1970, Ser. No. 49,306
Int. Cl. F04b *11/00, 39/10, 21/02*
U.S. Cl. 417—542 8 Claims



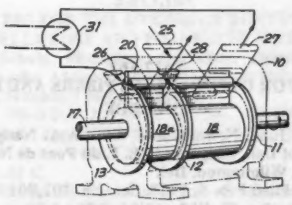
A diaphragm type fuel pump is provided made of body castings with sheet metal stamped airdomes insertable in one of the cast bodies in such a position as to provide airdomes for inlet and outlet passages. One such airdome has incorporated therein a cylindrical filter element to effect a unitary airdome and filter cartridge or assembly. Airdomes and filters may be inserted in pumps of the invention positioned as determined by the mode of mounting of any such pump, i.e., whether the inlet and outlet conduits are above or below the pumping diaphragm when the pump is mounted on an engine.

3,617,158

MULTISTAGE ROTARY COMPRESSOR

Masakazu Yamamoto, Tokyo, and Kenji Inaba, Koube, both of Japan, assignors to Mitsui Shipbuilding and Engineering Co., Ltd., Chuoku, Tokyo, Japan

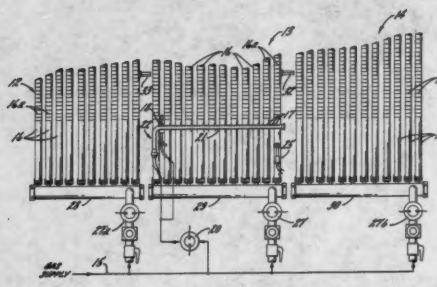
Filed Jan. 28, 1970, Ser. No. 6,382
Claim priority, application Japan, Feb. 8, 1969, 44/9674
Int. Cl. F01c *1/30, 11/00, 1/00*
U.S. Cl. 418—11 3 Claims



A multistage rotary compressor having longitudinally aligned cylindrical chambers in which cylindrical rotary pistons are eccentrically mounted on a shaft. A longitudinal partition plate is slidably mounted in the casing to project into the chambers and engage against the pistons as they rotate, the position of the partition plate being determined by cams eccentrically mounted on the shaft. Gas suction and

discharge ports are provided in the cylindrical wall of each chamber on opposite sides of the partition and the low-pressure discharge is directed into the high-pressure suction port by way of an intermediate cooler which operates to cool the partially compressed gas.

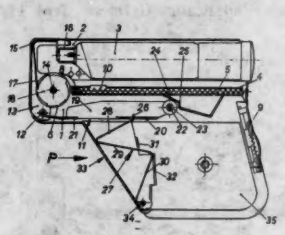
3,617,159
GAS-BOILER IGNITING SYSTEM
William C. Arndt, Michigan City, Ind., assignor to Weil-McLain Company, Inc., Michigan City, Ind.
Filed Aug. 15, 1969, Ser. No. 855,070
Int. Cl. F23n *5/20*
U.S. Cl. 431—6 **5 Claims**



An ignition system for a gas-fired boiler is provided in which electrical circuitry is utilized in a novel matter to consecutively initiate and terminate several stages in the ignition of the boiler burners. Fuel is initially supplied to a multiport pilot burner, is ignited, and the existence of the flame across the entire length of the multiport pilot burner is positively assured by an ultraviolet flame-sensing means. Next, the flow of fuel to the main burner is initiated, and after a predetermined time, the fuel flow to the multiport pilot burner is halted, thereby extinguishing the multiport pilot burner flame. The above-discussed sensing means is then used to supervise and insure that main burner flame is present. Fuel supply to the main burner is cut off in response to an indication by the sensing means that main burner flame is not present.

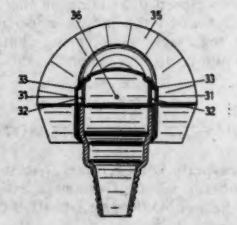
3,617,160
DEVICE FOR ACTUATING THE FRICTION WHEEL OF A PYROPHORIC LIGHTER
Alfred Racek, A 1170 Zwerngasse 59, Vienna, XVII, Austria
Filed Oct. 22, 1969, Ser. No. 868,403
Claims priority, application Austria, Oct. 22, 1968, A 10297/68
Int. Cl. F23q *2/06*
U.S. Cl. 431—275 **10 Claims**

An actuating device is disclosed for actuating a rotatable friction wheel of a pyrophoric lighter in which the friction wheel is rotatable by a driving member, which in turn is displaceable by an actuating member and a one-way coupling member connected to the driving member. A pronounced resistance is disposed in the path of travel of the driving member to oppose the movement thereof and the driving member is urged against the resistance by a single spring



serving also as a restoring means for the driving member. In one embodiment the resistance is formed by a hump on a cam surface on which travels a roller carried by the driving member. In a second embodiment, the resistance is formed by a roller carried on a pivotal arm whose movement is opposed by the spring.

3,617,161
GAS BURNERS
Aldo Polidoro, Via Rosmini, 10, Schio, Vicenza, Italy
Filed Sept. 3, 1969, Ser. No. 854,952
Claims priority, application Italy, Sept. 7, 1968, 61625 A/68
Int. Cl. F23d *13/36*
U.S. Cl. 431—349 **1 Claim**



A gas burner has a hollow cylindrical body and a cap having holes or a slit. The burner is fed with combustible gas through an intake. The holes or slit form nozzles for jets of this gas which produce a flame disposed as a fan. Guard plates may be used to protect the flame from the sides. The flame is fed only with secondary combustion air.

CHEMICAL

3,617,162
METHOD FOR DYEING GLASS FIBERS AND PRODUCT THEREOF
Siegfried K. June, Newark, and William A. Neely, Wilmington, both of Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.
Filed Feb. 5, 1968, Ser. No. 702,801
Int. Cl. C03c *17/00;* **D06p** *3/80*
U.S. Cl. 8—8 **11 Claims**

Glass fibers are coronized and then contacted with aqueous chromic acid. The chromic acid treatment increases the surface area of the fibers and deposits chromate ions on their surface. The treated fibers are washed to remove excess chromate ions, dyed with a cationic or mordant dye and then overcoated with a suitable material, e.g., a plastic or elastomeric film or a chrome complex.

3,617,163
BASIC DYES FOR USE IN COLORING HAIR
Gregoire Kalopissis, Paris, and Andree Bugaut, Boulogne-sur-Seine, both of France, assignors to L'Oreal, Paris, France
Filed Jan. 9, 1967, Ser. No. 607,898
Claims priority, application Luxembourg, Jan. 10, 1966, 50,233
Int. Cl. A61k *7/12*
U.S. Cl. 8—10 **4 Claims**

A hair dyeing composition comprises an aqueous solution of a hair coloring amount of a dye compound having the formula A–NR–$(CH_2)_n$–NHR′ wherein R and R′ each independently are selected from the group consisting of hydrogen, lower alkyl and lower alkoxy, *n* is an integer of 2–6 and A is selected from the group consisting of anthroquinone, azo and benzene. The composition contains 0.01 to 3 percent of said dye compound and has a pH of about 4–10.

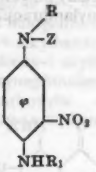
3,617,164

PROCESS FOR DYEING HAIR AND COMPOSITION THEREFOR

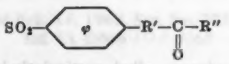
Gregoire Kalopissis, Paris; Andree Bugaut, Boulogne-Sur-Seine, and Vahan Zorayan, Enghien-les-Bains, all of France, assignors to L'Oreal, Paris, France

Filed May 13, 1968, Ser. No. 728,750
Claims priority, application Luxembourg, May 16, 1967, 33,676
Int. Cl. D06p 3/04
U.S. Cl. 8—10 4 Claims

A keratin fiber dye composition which comprises a solvent and a dyeing amount of a dye compound having the formula:



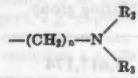
in which R is selected from the group consisting of lower alkyl, hydroxy alkyl, carboxyalkyl, carbethoxyalkyl, carbamylalkyl, haloalkyl, aminoalkyl, aminodialkyl, alkylaminodialkyl, alkyl morpholino, alkyl piperidino, having one–six carbon atoms on each mentioned alkyl portion, Z is selected from the group consisting of



Ain which R' is selected from the

group consisting of methyl and NO_2, and R'' is selected from the group consisting of hydrogen and lower alkyl having one–six carbon atoms,

and R_1 is selected from the group consisting of lower alkyl, lower hydroxyalkyl, lower alkoxyalkyl, and



in which *n* is a whole number between two and six inclusive, and R_2 and R_3, which may be identical or different, are selected from the group consisting of hydrogen, lower alkyl, lower hydroxyalkyl, and with the nitrogen atom adjacent R_2 and R_3 may form morpholino and piperidino, each R_1, R_2, R_3 having one–six carbon atoms on their alkyl portion,

and the process of dyeing keratin fibers.

3,617,165

POLYMERIC HAIR COLORING COMPOSITIONS

Gregoire Kalopissis, Paris, France, assignor to Societe Anonyme dite: L'Oreal, Paris, France

Filed Sept. 2, 1966, Ser. No. 576,839
Continuation-in-part of Ser. No. 523,525, Jan. 28, 1966, continuation-in-part of Ser. No. 225,542, Oct. 1, 1962, abandoned
Claims priority, application France, Apr. 20, 1966, 58,324
Luxembourg, Jan. 1, 1966, June 14, 1966, June 16, 1966, 50,228, 51,325, 51,345
Int. Cl. A61k 7/12
U.S. Cl. 8—10.1 6 Claims

Soluble colored polymers that are suitable for use as hair dyes.

3,617,166

DYEING KERATINOUS FIBERS WITH N-ALKYL-N-CARBAMYLALKYL-ISOPIERAMIC ACID COMPOUNDS

Jerzy Josef Bartoszewicz, Twickenham, assignor to Lever Brothers Company, New York, N.Y.

Division of Ser. No. 413,986, Nov. 11, 1964, Pat. No. 3,420,883.
Filed May 23, 1968, Ser. No. 751,632
Claims priority, application Great Britain, Nov. 26, 1963, 46699/63
Int. Cl. A61k 7/12
U.S. Cl. 8—10.1 6 Claims

This disclosure is concerned with dyeing compositions containing certain N-alkyl-N-carbamylalkyl-isopicramic acid compounds and to methods of dyeing keratinous fibers with these compositions.

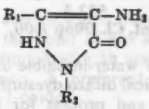
3,617,167

METHODS AND COMPOSITIONS CONTAINING 4-AMINOPYRAZOLONES FOR THE DYEING OF HUMAN HAIR

Peter Berth, Dusseldorf-Benrath, and Karl-Josef Boosen, Dusseldorf-Holthausen, both of Germany, assignors to Therachemie Chemisch Therapeutische Gesellschaft m.b.H., Dusseldorf, Germany

Filed July 29, 1966, Ser. No. 568,750
Claims priority, application Germany, Aug. 5, 1965, T 29157
Int. Cl. A61k 7/12
U.S. Cl. 8—10.2 4 Claims

In the process of dyeing the living human hair which comprises treating the hair at a temperature of from 15° C. to 40° C. with an aqueous composition for dyeing human hair comprising an oxidation dyestuff and customary dyestuff adjuvants in the presence of an oxidizing agent, and thereafter rinsing the hair, the improvement which comprises utilizing as said oxidation dyestuff, from 0.1 percent to 5 percent by weight of an oxidation dyestuff combination of (a) a developer component compound having the formula



R_1 is a member selected from the group consisting of hydrogen, -$CONH_2$, -COOH, -COOR', alkyl having 1 to 10 carbon atoms, phenyl and nicotinoyl; R' represents an alkyl having 1 to 4 carbon atoms consisting of hydrogen, alkyl having 1 to 10 carbon atoms, phenyl and p-sulfonamidophenyl; and (b) a coupling component, said developer component compound being present in substantially equimolar to a slight excess with respect to said coupling component compound.

3,617,168

DYEING PROCESS FOR BLENDS OF CELLULOSIC AND POLYESTER FIBRES

Rolf Mack, Binningen Baselland, Switzerland, assignor to Sandoz Ltd., also known as Sandoz A.G., Basel, Switzerland

Filed Mar. 25, 1968, Ser. No. 715,517
Claims priority, application Switzerland, Apr. 7, 1967, 4994/67
Int. Cl. D06p 3/82
U.S. Cl. 8—21 C 14 Claims

A process for dyeing blends of natural or regenerated cellulosic fibers and polyester fibers with reactive and disperse dyes, wherein the cellulosic component of the blend is dyed first with reactive dyes at temperatures in the range of 40° to 100° C. and in the pH range of 8.5 to 13, after which the pH is adjusted to 4–7, the disperse dye added and the polyester component of the blend dyed.

3,617,169

PROCESS FOR THE DYEING OF MIXTURES OF CELLULOSE AND POLYESTER FIBERS

Wolfgang Schulz, Pfullingen, Germany, assignor to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning, Frankfurt Main, Germany

Filed Feb. 27, 1968, Ser. No. 708,510
Claims priority, application Germany, Mar. 3, 1967, F 51703
Int. Cl. D06p 3/82
U.S. Cl. 8—21 C 5 Claims

Process for the dyeing of mixtures of cellulose fibers and fibrous materials of linear polyesters in a single bath with reactive dyestuffs and dispersion dyestuffs by treating the said fibrous materials at temperatures in the range of about 20° to 80° C. with dyebaths which contain alkaline agents in addition to the said dyestuffs, then adjusting the pH of the bath to a value in the range of 3.5 to 6 by adding free acids, and completing the dyeing at temperatures in the range of from about 95° C. to 140° C.

3,617,170

PROCESS FOR DYEING AND PRINTING POLYESTER TEXTILE MATERIALS WITH ARLACTONE DYES AND MIXTURES OF AZLACTONE DYES

Guenter Hansen, Ludwigshafen, and Hans-Richard Mueller, Fussgoenheim, both of Germany, assignors to Badische Anilin - & Soda-Fabrik Aktiengesellschaft Ludwigshafen & Rhine, Ludwigshafen, Rhineland-Pfalz, Germany

Filed Nov. 10, 1969, Ser. No. 875,506
Claims priority, application Germany, Nov. 20, 1968, P 18 09 949.5
Int. Cl. D06p *3/52*
U.S. Cl. 8—25 3 Claims

Process for dyeing synthetic polyester textile material with dyes of the azlactone series in fast and brilliant yellow shades.

3,617,171

DYESTUFF MIXTURES OF WATER-INSOLUBLE DISAZO DYESTUFFS AND PROCESS FOR THEIR PREPARATION

Joachim Ribka, Offenbach, am Main, Germany, assignor to Farbwerke Hoechst Aktiengesellschaft Vormals Meister, Lucius & Bruning, Frankfurt am Main, Germany

Filed Dec. 4, 1969, Ser. No. 882,323
Claims priority, application Germany, Dec. 9, 1968, P 18 13 522.3
Int. Cl. D06p *1/00*
U.S. Cl. 8—26 4 Claims

Dyestuff mixtures of water-insoluble disazo dyestuffs consisting of two symmetrical disazo dyestuffs and one asymmetrical disazo dyestuff and process for preparing them by coupling in a molar ratio of 1:2 tetrazotized 4,4'-diamino-3,3'-dichlorodiphenyl with a mixture of 1-phenyl-3-methyl-pyrazolone-(5) and 1-p-tolyl-3-methyl-pyrazolone-(5). Said mixture can be used for the preparation of printing inks and for dyeing and printing plastic masses, synthetic or natural resins, paper, textiles, and spinning solutions. The dyeings and printings obtained with said mixtures are above all distinguished by a very good fastness to light.

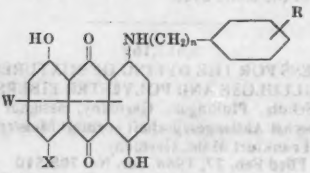
3,617,172

METHOD OF DYEING ALUMINUM-MODIFIED POLYPROPYLENE FIBERS WITH ANTHRAQUINONE DYES

Yutaka Hosoda, Tokyo, Japan, assignor to Mitsui Kagaku Kogyo Kabushiki Kaisha (Mitsui Chemical Industry Co., Ltd.), Chuo-ku, Tokyo, Japan

Filed June 28, 1968, Ser. No. 741,224
Int. Cl. D06p *1/24*; C09b *1/28*
U.S. Cl. 8—39 1 Claim

Method of dyeing polyolefin fibers which comprises applying anthraquinone dyes of a general formula



(in which X is nitro or amino group, W is hydrogen, chlorine or bromine atom, R is hydrogen atom or a lower alkyl group, and *n* is an integer of 1–4) to metal-modified polyolefin fibers.

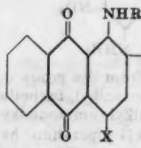
3,617,173

2-BENZOYLANTHRAQUINONE DYES FOR POLYESTER FIBERS

John David Hildreth, Bramhall, England, and Philip Wehner, Cranmoor Manor, N.J., assignors to Toms River Chemical Corporation, Toms River, N.J.

Continuation-in-part of application Ser. No. 386,735, July 31, 1964, now abandoned. This application June 24, 1968, Ser. No. 739,146
Int. Cl. D06p *1/20*
U.S. Cl. 8—39 3 Claims

Dyeings and printings are produced on fibrous materials of aromatic polyesters, especially polyethylene terephthalate, by using as dyestuff a 2-benzoylanthraquinone of the formula:



in which R is hydrogen, alkyl, particularly lower alkyl, and sulfonyl, particularly arylsulfonyl, including substituted arylsulfonyl, R' is phenyl, naphthyl, diphenyl and phenyl, naphthyl or diphenyl containing as substituents, halogen, i.e. chlorine, bromine or fluorine, lower alkyl or alkoxy substituents, and X is anilino, toluidino, acylamino, alkylsulfonamido, or benzenesulfonamide where the benzene nucleus is devoid of a water solubilizing group.

3,617,174

PROCESS FOR DYEING AND PRINTING SYNTHETIC FIBERS WITH TETRA-α-SUBSTITUTED ANTHRAQUINONE

Walter Hohmann, Leverkusen; Heinrich Vollman, Leverkusen; Hans-Samuel Bien, Burscheid, and Gunter Gehrke, Koeln-Flittard, all of Germany, assignors to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany

Division of Ser. No. 777,466, Nov. 20, 1966, Pat. No. 3,558,670 continuation of Ser. No. 527,502, Feb. 15, 1966, abandoned.
Filed July 22, 1969, Ser. No. 871,385
Claims priority, application Germany, application Feb. 19, 1965, F 42295
Int. Cl. C09b *5/00*
U.S. Cl. 8—39 6 Claims

An improved process for dyeing linear polyesters wherein quinizarin dyestuffs having anilino, substituted anilino or benzylamino substituents in the 5-position and the 8-position or, alternatively, having phenyl mercapto or substituted phenyl mercapto substituents in the 8-position.

3,617,175

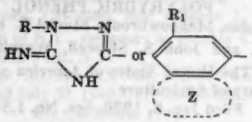
DYEING NICKEL-MODIFIED POLYOLEFIN WITH BENZAMIDAZOLEAZO, BENZTRIAZOLEAZO, OR QUINOXALINEAZO DYES MODIFIED BY CHLORINE, LOWER ALKYL OR LOWER ALKOXY GROUPS OR 5-LIMINO-4,5-DIHYDRO-1,2,4-TRIAZOLEAZO

Reinhard Mohr, Offenbach am Main, and Fritz Osterloh, Bad Soden Taunus, both of Germany, assignors to Farbwerke Hoechst vormals Meister Lucius & Bruning, Frankfurt am Main, Germany

Filed Feb. 10, 1965, Ser. No. 431,719
Claims priority, application Germany, Feb. 14, 1964, F 42001
Int. Cl. D06p *1/10*
U.S. Cl. 8—42 6 Claims

Textile materials of nickel-containing polypropylene are dyed and printed deep shades having excellent fastness pro-

perties with azo dyestuffs of the formula
Y—N=N—A,
wherein Y is



wherein R is phenyl or substituted phenyl, R_1 is halogen, alkyl or alkoxy, Z is the members required for the completion of an imidazole, triazole or 1,4-diazine ring, and A is the radical of a 1-hydroxy-4-halogenbenzene, 1-hydroxy-4-alkoxybenzene, 1-hydroxy-4-alkylbenzene, 3-hydroxy-diphenylamine, 2,4-dihydroxy-1-acylbenzene, 2-hydroxynaphthalene, 2-hydroxynaphthalene-3-carboxylic acid, 2-hydroxynaphthalene-3-carboxylic acid methylester, 2-hydroxycarbazole, 3-hydroxy-diphenylene oxide or 1-phenyl-3-methyl-5 pyrazolone.

3,617,176

AZO DYESTUFF PREPARATIONS WITH AN ALKALI METAL PHOSPHATE

Heinz Machatzke, Leverkusen, Germany, assignor to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Feb. 15, 1968, Ser. No. 705,599
Int. Cl. D06p *1/10, 1/68*
U.S. Cl. 8—42 **3 Claims**

Cold water-soluble dyestuff compositions containing 1:2 chromium or cobalt complex azo dyestuff free of reactive groups and containing at least one unsubstituted or substituted-sulfonamide group and 10 to 200 parts by weight based on 100 parts of said dyestuff of a solubilizing agent comprising trisodium phosphate or tripotassium phosphate, are disclosed. Optionally, 5 to 300 parts by weight of an anionic dispersing agent, e.g. naphthalene sulfonic acids, can be included. The compositions are especially suitable for dyeing N-containing materials e.g. silk, wool and polyamides.

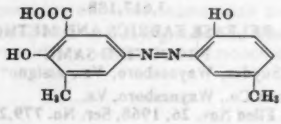
3,617,177

METHOD OF DYEING ALUMINUM-MODIFIED POLPROPYLENE FIBERS WITH MONOAZODYE

Yutaka Hosoda, Tokyo, Japan, assignor to Mitsui Kagaku Kogyo Kabushiki Kaisha (Mitsui Chemical Industry Co., Ltd.), Chuo-ku, Tokyo, Japan

Filed June 28, 1968, Ser. No. 741,227
Int. Cl. D06p *1/10;* **C09b** *45/46*
U.S. Cl. 8—42 **2 Claims**

Method of dyeing metal-modified polyolefin fibers, which comprises applying a monoazo dye of the formula



to metal-modified polyolefin fibers.

3,617,178

SENSITIZATION OF BACTERIAL SPORES TO THE LETHAL EFFECTS OF CERTAIN TREATMENTS

John Gannon Clouston, Carss Park, New South Wales, Australia, assignor to Australian Atomic Energy Commission, New South Wales, Australia

Filed Nov. 19, 1970, Ser. No. 91,199
Int. Cl. A61l *1/00*
U.S. Cl. 21—2 **12 Claims**

A method for sterilizing, disinfecting or preserving substances, whether fluid or solid, by subjecting them to hydrostatic pressure for a duration sufficient to germinate bacterial spores present in the substances either before or during the usual treatments such as radiation, heating or chemical treatment.

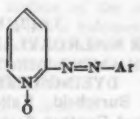
3,617,179

AMINOARYLAZOPYRIDINE OXIDE DYEING NICKEL MODIFIED POLYPROPYLENE FIBERS AND FIBERS SO DYED

Charles Edward Lewis, Somerville, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Dec. 29, 1969, Ser. No. 888,921
Int. Cl. D06p *3/00*
U.S. Cl. 8—42 D **8 Claims**

Nickel-containing polypropylene fibers and fabrics are dyed with azo dyes conforming to the formula:



wherein Ar is an aryl radical containing a hydroxy group positioned ortho to the point of azo attachment and which may be further substituted with an amino, alkyl, alkylamino or dialkylamino group. A preferred dye is 2-hydroxy-1-naphthylazopyridine-1-oxide.

3,617,180

AZOIC DYE COMPOSITION CONTAINING OXYGEN-CONTAINING PRIMARY AMINES AND PROCESS OF USING SAME

Clemens Streck, Loudonville, N.Y., assignor to GAF Corporation, New York, N.Y.

Filed Aug. 19, 1968, Ser. No. 753,744
Int. Cl. D06p *1/02*
U.S. Cl. 8—45 **16 Claims**

A process for the neutral developing of azoic colors and a dye composition which employs said process, which process comprises the use of an oxygen-containing primary amine in combination with coupling components and diazo amino compounds.

3,617,181

PROCESS FOR FINISHING CELLULOSIC TEXTILE MATERIALS WITH ETHERIFIED MELAMINES

Michael Thomas Beachem, Somerset, and Frederic Houghton Megson, Martinsville, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Apr. 6, 1970, Ser. No. 31,055
Int. Cl. D06p *5/06;* **D06m** *13/38*
U.S. Cl. 8—74 **5 Claims**

This invention relates to new and etherified methylolated melamines and their use on cellulosic textile materials dyed with direct dyes. The new etherified melamines impart crease-resistance to such materials and the light-fastness of the direct dyes is improved.

3,617,182

PROCESS FOR FINISHING CELLULOSIC TEXTILE MATERIALS WITH ETHERIFIED MELAMINES

Michael Thomas Beachem, Somerset, and Frederic Houghton Megson, Martinsville, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Apr. 6, 1970, Ser. No. 31,054
Int. Cl. D06m *13/38;* **D06p** *5/06*
U.S. Cl. 8—74 **5 Claims**

This invention relates to new amino-methylolated melamines and to their use on cellulosic textile materials that have been dyed with direct dyes. The new amino-methylolated melamines impart crease-resistance to such materials and dyed materials so finished have improved light-fastness.

3,617,183

ETHYL AURAMINE SOLUTION

Rill Lewis Grosklos, Williamstown, W. Va.; Ralph Eustace Hutcheson, Marietta, Ohio, and Earl Robert Whiston, Williamstown, W. Va., assignors to American Cyanamid Company, Stamford, Conn.

Filed Sept. 27, 1967, Ser. No. 671,142
Int. Cl. C09b 67/00
U.S. Cl. 8—93 6 Claims

Stable ethyl auramine dye solutions containing from 25 to 40 weight percent real dye are provided by the use of ethylene glycol, diethylene glycol, the monomethyl ether of ethylene glycol or the monoethyl ether of ethylene glycol as the solvent vehicle.

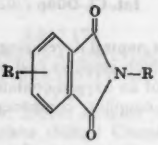
3,617,184

N-ALKYL OR N-ALKOXYLALKYL PHTHALIMIDES MIXED WITH AMINO-IMINO PYRROLENINES AND DYEING THEREWITH

Johannes Eibl, Burscheid, Kaltenherberg; Walther Wolf, Leverkusen, and Gunther Boehmke, Leverkusen, Grossendriesch, all of Germany, assignors to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Oct. 16, 1969, Ser. No. 867,080
Claims priority, application Germany, Oct. 23, 1968, P 18 04 527.7
Int. Cl. D06p 1/68
U.S. Cl. 8—85 5 Claims

Porphyrazine dye forming amino-imino-pyrrolenine, such as the phthalocyanine forming amino-imino-isoindolenine, is mixed with an N-substituted phthalimide of the following formula:



where R is a haloalkyl-, acyloxyalkyl-, carboxyalkyl-, hydroxyalkyl-, alkoxycarbonylalkyl- or alkyl- group, the chains of which contain one to eight carbon atoms and can be interrupted by oxygen atoms to form alkoxyalkyl chains; R_1 is a hydrogen, halogen, short chain alkoxy, short chain alkyl carboxylic acid ester, phenyl or nitro-group. Hydrotropic agents, such as hydroxyalkyl ureas can be mixed with the phthalimide.

3,617,185

STABLE HIGHLY CONCENTRATED SOLUTIONS OF BASIC DYES

Walter G. Drautz, Delmar, N.Y., assignor to GAF Corporation, New York, N.Y.

Filed Aug. 19, 1968, Ser. No. 753,751
Int. Cl. C09b 67/00
U.S. Cl. 8—93 2 Claims

A composition which is employed in the preparation of solutions of basic dyes to maintain their stability during extended periods of storage which comprises in admixture methyl alcohol, 2,2'-thiodiethanol, and a basic dye stock.

3,617,186

TANNING WITH TRIS(HYDROXYMETHYL)NITROMETHANE AND A POLYHYDRIC PHENOL

Wallace Windus, Meadowbrook; Muriel L. Happich, Jenkintown, Pa., and John S. Showell, Washington, D.C., assignors to The United States of America as represented by the Secretary of Agriculture

Filed Jan. 8, 1970, Ser. No. 1,565
Int. Cl. C14c 3/18
U.S. Cl. 8—94.24 11 Claims

A process for tanning skins in which skins are first impregnated and drummed at a pH range of 4.5 to 4.7 in a buffered aqueous solution containing tris(hydroxymethyl)nitromethane and a polyhydric phenol such as resorcinol, catechol, hydroquinone, pyrogallol and phloroglucinol. During the operation the pH of the tanning solution is adjusted to the range of 8.0 to 8.5 and the skins drummed until tanned. Skins tanned by the above process can be retanned with any other tanning material.

3,617,187

PROCESS FOR PREPARATION OF SILICONE GRAFT COPOLYMERIZED FIBER OR CLOTH

Toshizo Chitani; Shikanosuke Yokoyama, and Shinko Nishide, all of Tokyo, Japan, assignors to Hakuyosha Co., Ltd. and Toshizo Chitani, part interest to each

Filed July 10, 1967, Ser. No. 656,305
Claims priority, application Japan, July 18, 1966, 41/46559, 41/46560, Nov. 2, 1966, 41/71954
Int. Cl. D06m 11/00; D06p 5/02
U.S. Cl. 8—115.5 5 Claims

A silicone graft copolymerized fiber or cloth is prepared by first dyeing the cloth with a dyestuff containing metal in the form of a complex salt, and then applying a silicone having a general formula of

wherein R and R^1 are hydrogen or alkyl radicals up to five carbon atoms and R and R^1 can be the same or different, and n is an integer, to the dyed cloth and subjecting said silicone coated dyed cloth to an ionizing radiation wherein the dosage of said ionizing radiation is within a range of from 10^4 rad. to 10^7 rad.

3,617,188

SOIL RELEASE FABRICS AND METHOD FOR PRODUCING SAME

Duane W. Snyder, Waynesboro, Va., assignor to Crompton-Shenandoah Co., Waynesboro, Va.

Filed Nov. 26, 1968, Ser. No. 779,250
Int. Cl. D06m 13/02, 13/54
U.S. Cl. 8—115.5 16 Claims

A process for treating textile materials to impart soil-release and stain-release characteristics thereto and the products produced thereby are described which comprises treating textile materials, preferably fabrics containing cellulosic fibers or a blend of cellulosic fibers and synthetic fibers such as polyesters, with an oil, preferably refined mineral oil, to substantially saturate the fabric fibers with the oil thereby attaining a textile material having improved soil and stain release characteristics. The mineral oil composition may be used alone or in conjunction with other compositions such as those which impart permanent-press and water-repellency characteristics to a textile material.

3,617,189

COMPOSITION AND PROCESS FOR TREATING CELLULOSIC MATERIALS

George M. Wagner, Lewiston, and William J. Vullo, North Towanda, both of N.Y., assignors to Hooker Chemical Corporation, Niagara Falls, N.Y.

Division of Ser. No. 510,083, Nov. 16, 1965, abandoned. Filed July 30, 1969, Ser. No. 846,283

Int. Cl. D06m *13/42*

U.S. Cl. 8—116.2 5 Claims

A composition useful in treating cellulosic materials to make them durably water repellent which comprises an aqueous emulsion of a soap, a surface active agent, water and a polyaryl polyisocyanate containing at least three aryl groups and an average of at least three isocyanate groups, a portion of which isocyanate groups may be modified by reaction with an alcohol, thioalcohol, organic acid, amine or amide. This composition is applied to the cellulosic material and is, thereafter, cured with water.

3,617,190

METHYLOLATED SULFONAMIDES AND CROSSLINKING OF POLYMERS THEREWITH

Giuliana C. Tesoro, Dobbs Ferry, N.Y., assignor to J. P. Stevens & Co. Inc., New York, N.Y.

Filed Nov. 16, 1965, Ser. No. 508,149

Int. Cl. D06m *13/40, 13/38;* C07c *143/74*

U.S. Cl. 8—115.6 12 Claims

Dimethylol sulfonamides, alkyl ethers thereof and polymers therefrom are produced and said materials are used to react with cellulosic materials and to bind polyhydroxylated polymers to cellulosic materials through coreaction.

3,617,191

TREATMENT OF TEXTILE MATERIAL WITH BORIC ACID

William Wade Caldwell, Abbeville, S.C., assignor to Deering Milliken Research Corporation, Spartanburg, S.C.

Filed Sept. 23, 1968, Ser. No. 761,796

Int. Cl. D06m *9/00*

U.S. Cl. 8—115.7 11 Claims

A process for improving the resistance to discoloration during irradiation of a blended textile material of polyamide and cellulosic fibers which comprises applying to said textile material a metal salt or an amino salt catalyst, boric acid and a monomer containing ethylenic unsaturation and a group capable of reacting with hydroxyl groups and irradiating the treated textile material to polymerize said monomer.

3,617,192

CROSSLINKING OF CELLULOSIC MATERIALS WITH PRODUCTS PRODUCED BY THE REACTION OF ALKYL SULFONAMIDES AND FORMALDEHYDE UNDER ALKALINE CONDITIONS

Ronald Swidler, Pasadena, and Clifford M. Moran, San Gabriel, both of Calif., assignors to Cotton Producers Institute, Memphis, Tenn.

Filed Nov. 22, 1965, Ser. No. 509,167

Int. Cl. D06m *13/38, 13/14;* C07c *13/74*

U.S. Cl. 8—116.3 3 Claims

Formaldehyde is reacted with alkyl sulfonamides under alkaline conditions. The resulting products are useful modification agents for cellulosic fibers.

3,617,193

FLAME-RETARDANT BIS(EPOXYALKYL) METHYLPHOSPHONATE TREATED SUBSTRATE AND PROCESS THEREFOR

Giuliana C. Tesoro, Dobbs Ferry, N.Y.; Donald R. Moore, Rutherford, and Wing-Kai Lee, Hackensack, N.J., assignors to J. P. Stevens & Co., Inc., New York, N.Y.

Filed Sept. 12, 1967, Ser. No. 667,070

Int. Cl. D06m *13/28, 13/38;* C09k *3/28*

U.S. Cl. 8—116.2 17 Claims

A flammable substrate, especially a cellulosic substrate such as cotton, is rendered flame-retardant by treatment with (1) a bis(epoxyalkyl) methylphosphonate such as bis(2,3-epoxypropyl) methylphosphonate or bis(2,3-epoxypropyl) chloromethylphosphonate, and (2) an organic nitrogen-containing compound, such as urea or N^2, N^4, N^6-tris(hydroxymethyl)melamine. A treatment which is resistant to laundering is obtained when at least the phosphonate is insolubilized by polymerization on the surface of the substrate and/or reaction with the substrate. When a halomethylphosphonate is employed, the phosphorus content of the treated substrate can be increased by further treatment with a tris(haloalkyl) phosphite and/or a trialkyl phosphite.

3,617,194

TEXTILE FINISHING PROCESS USING CHLORINATED HYDROCARBON SOLVENTS AND SULFOHALIDE REACTION CATALYSTS

Michael Bannister; James Albert Moyse; Alexander Parkinson; James William Roberts, Manchester, and Brian Crosbie Fielding, Runcorn, all of England, assignors to Imperial Chemical Industries Limited, London, England

Filed June 24, 1968, Ser. No. 739,209

Claims priority, application Great Britain, May 10, 1968, 22,326/68

Int. Cl. D06m *13/08, 13/14;* C08g *51/30*

U.S. Cl. 8—116.3 13 Claims

Crease-resistance and easy-care properties of textile materials containing at least 20 percent by weight of cellulosic material are improved by impregnating the textile material with a solution or dispersion in a halogenated hydrocarbon solvent of a resin precondensate and an acid catalyst therefor, then subjecting the impregnated material to the action of hot water or steam and finally heating.

3,617,195

TEXTILE FINISHING PROCESS USING A CHLORINATED HYDROCARBON AS THE REACTANT SOLVENT

James Albert Moyse, Manchester; Alexander Parkinson, Manchester; James William Roberts, Manchester, and Brian Crosbie Fielding, Runcorn, all of England, assignors to Imperial Chemical Industries Limited, London, England

Filed June 24, 1968, Ser. No. 739,212

Claims priority, application Great Britain, June 26, 1967, 29424/67

Int. Cl. D06m *13/08, 13/40;* C08g *51/30*

U.S. Cl. 8—116.3 13 Claims

Crease-resistance and easy-care properties of textile materials containing at least 20 percent by weight of cellulosic material are improved by impregnating the textile material with a solution or dispersion in a halogenated hydrocarbon solvent of a resin precondensate and an acid catalyst therefor, then subjecting the impregnated material to the action of hot water or steam and finally heating.

3,617,196

TWO-STEP CELLULOSIC FABRIC MODIFICATION UNDER DIFFERENT REACTION CONDITIONS

Donald J. Gale, Spartanburg, S.C., assignor to Deering Milliken Research Corporation, Spartanburg, S.C.

Continuation of application Ser. No. 691,650, Dec. 18, 1967, now abandoned. This application Oct. 29, 1969, Ser. No. 871,641

Int. Cl. D06m *13/54, 13/40, 13/12*

U.S. Cl. 8—116.3 6 Claims

Cellulosic fabrics are reacted in two steps with creaseproofing compounds having two or more functional

groups which are activatable under different reaction conditions. The fabric may be formed into a garment between the reaction steps.

3,617,197

IMPROVING THE WRINKLE RESISTANCE OF CELLULOSIC TEXTILES

Herbert M. Ulrich, Vienna, Austria, assignor to Vereinigte Farbereien Gesellschaft m.b.H., Vienna, Austria

Filed Aug. 15, 1967, Ser. No. 660,612
Claims priority, application Austria, Aug. 19, 1966, A7926/66
Int. Cl. D06m *13/22, 13/14, 13/38*
U.S. Cl. 8—116.3 **8 Claims**

A process for finishing cellulosic textile materials with N-methylol compounds and chlorinated or brominated ethylene carbonates.

3,617,198

METHOD OF REDUCING THE AMOUNT OF FREE FORMALDEHYDE IN SENSITIZED FABRIC FOR POSTCURE DURABLE PRESS PROCESSING

John D. Reid, New Orleans; Robert M. Reinhardt, New Orleans, and Russell M. H. Kullman, Metairie, all of La., assignors to The United States of America as represented by the Secretary of Agriculture

Filed Dec. 12, 1969, Ser. No. 884,706
Int. Cl. D06m *13/12, 13/34*
U.S. Cl. 8—116.3 **3 Claims**

Sensitized cotton fabrics, intended for postcure durable press processing, were subjected to aeration with moist air (10 percent to 100 percent relative humidity) or with steam for periods of time varying from about 15 seconds to 24 hours to reduce free formaldehyde content and to reduce the release of formaldehyde from the sensitized fabrics. This method does not adversely affect the use of the sensitized fabric in postcure durable press processing nor does it impair the utility, esthetics, value, or durability of the resulting durable press products.

3,617,199

ALKALI METAL CHLORIDES AND NITRATES USED TO INHIBIT CELLULOSE DEGRADATION IN ACID CATALYZED CROSS-LINKING PROCESSES

William M. Russell, Belchertown, Mass., assignor to Johnson & Johnson

Continuation-in-part of application Ser. No. 407,865, Oct. 30, 1964, now abandoned. This application May 12, 1969, Ser. No. 823,956
Int. Cl. D06m *11/04, 13/14, 13/12*
U.S. Cl. 8—116.4 **10 Claims**

A process for treating a cellulose-containing textile material which comprises impregnating said material with a member selected from the group consisting of aldehydes, polymeric condensation products of diethylene glycol and formaldehyde, and mixtures of hydroxy-containing hemiacetals, in the presence of from about 0.1 percent to about 10 percent by weight of a metal sulfate selected from the group consisting of magnesium sulfate and zinc sulfate, and from about 0.05 percent to about 6 percent by weight of a chloride or nitrate anion donor selected from the group consisting of sodium chloride, potassium chloride, and sodium nitrate, and drying and curing said treated material to provide improved shrink and wrinkle resistance with minimized loss in tensile strength.

3,617,200

CONTROLING THE WASH LIQUID TEMPERATURE WHILE PREPARING PARCHMENTISED WEBS

Peter John Gilder, Ewell, Epsom, England, assignor to Wiggins Teape Research & Development Limited, London, England

Filed Sept. 19, 1968, Ser. No. 760,760
Claims priority, application Great Britain, Oct. 12, 1967, 46,678
Int. Cl. D21h *5/08;* **D06m** *1/14*
U.S. Cl. 8—118 **3 Claims**

A fibrous web is parchmentized by drawing the web from a parchmentizing bath and passing it through successive washing positions and the feature of the invention resides in maintaining at a substantially constant level the temperature of the washing liquid at the first washing position.

3,617,201

ESTERIFICATION OF CELLULOSIC TEXTILES WITH SORBIC ACID IN THE PRESENCE OF TRIFLUOROACETIC ANHYDRIDE USING CONTROLLED CELLULOSE-ACID-ANHYDRIDE RATIOS

Ralph J. Berni, Metairie; Ruth B. Benerito, New Orleans, and John B. McKelvey, New Orleans, all of La., assignors to The United States of America as represented by the Secretary of Agriculture

Continuation of application Ser. No. 643,300, May 26, 1967, now Patent No. 3,493,319. This application Nov. 19, 1969, Ser. No. 878,204
Int. Cl. D06m *13/20;* **C08b** *3/10*
U.S. Cl. 8—120 **1 Claim**

This invention relates to the production of partial cellulose esters with improved crease recovery through esterification of cellulose with unsaturated fatty acids in the presence of trifluoroacetic anhydride (TFAA) in benzene solution.

3,617,202

WOOL STABILIZATION PROCESS

Xavier Kowalski, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Apr. 24, 1968, Ser. No. 723,930
Int. Cl. D06m *3/02, 13/00*
U.S. Cl. 8—127.6 **11 Claims**

Wool is rendered resistant to shrinking by contact with a solution of [(mono-trichloro,) tetra-(monopotassium dichloro,)] penta-isocyanurate or (trichloro), (monopotassium dichloro,) di-isocyanurate.

3,617,203

MODIFICATION OF WOOL WITH BIS-(CHLOROMETHYL)-β-PROPIOLACTONE

William Gordon Rose, Berkeley, Calif., assignor to The United States of America as represented by the Secretary of Agriculture

Filed Feb. 27, 1970, Ser. No. 15,303
Int. Cl. D06m *13/12, 13/10*
U.S. Cl. 8—128 **3 Claims**

Wool is reacted with α,α-bis-(chloromethyl)-β-propiolactone, yielding a modified wool which exhibits an enhanced resistance to shrinking. Also the product is less inflammable than the untreated wool.

3,617,204

HOT GLYCOL PLASTICIZING REMOVAL OF HALOGENATED HYDROCARBON SOLVENT SCOURING LIQUOR ON POLYESTER TEXTILES

Harold Pirie, Runcorn, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Aug. 27, 1968, Ser. No. 755,741
Claims priority, application Great Britain, Sept. 6, 1967, 40,758/67
Int. Cl. D06m
U.S. Cl. 8—130.1 **5 Claims**

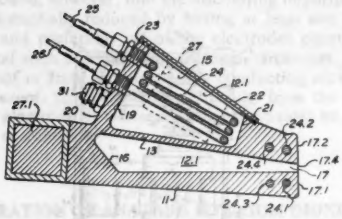
Polyester-containing textile materials are scoured with an organic solvent and the solvent is removed by passing the scoured textile into a liquid maintained at elevated tempera-

tures. The liquid is a substantially anhydrous, inert organic liquid which is a swelling agent for the polyester fibers of the textile material. The swelling agent allows an effective incorporation of a finishing material, such as a dye, into the textile material.

3,617,205
METHOD FOR CLEANING CARPETS AND LIKE MATERIALS

William H. Wisdom, 9806 Van Dyke Drive, Dallas, Tex.

Division of Ser. No. 712,123, Mar. 11, 1968, Pat. No. 3,439,374. Filed Dec. 20, 1968, Ser. No. 798,553
Int. Cl. A47l 7/00
U.S. Cl. 8—137 **3 Claims**



A carpet and rug cleaning method involving successive rolling, spraying, and nearly simultaneous exposure to vacuum and to heat. Method achieves faster drying than heretofor was common, with minimal wicking. Prerolling, spraying under pressure with the spray impinging the carpet at an acute angle so as to loosen rather than to imbed soil together with application of the vacuum and heat, used to achieve the foregoing.

3,617,206
PROCESSES FOR SCOURING TEXTILES

Xavier Kowalski, Creve Coeur, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Aug. 27, 1969, Ser. No. 854,358
Int. Cl. B08b 3/00; D06f
U.S. Cl. 8—137 **3 Claims**

Textile fibers which have been desized and are about to be bleached are scoured with a boiling alkaline caustic solution containing a surfactant and a solubilizing agent such as amino tri(methylene phosphonic acid). This process provides fibers with a substantially reduced impurity level and an end product which is substantially more conducive to a subsequent dyeing process.

3,617,207
ALKALINE SOLUTIONS CONTAINING CERTAIN ALKYLBENZENE SULFONATE WETTING AGENTS

Albert Benson, Fairlawn, and Gerhart Karg, Pompton Lakes, both of N.J., assignors to Witco Chemical Corporation, New York, N.Y.

Filed June 18, 1968, Ser. No. 737,829
Int. Cl. D06m
U.S. Cl. 8—139 **6 Claims**

Aqueous alkaline solutions having a pH of at least 10 containing at least about 0.01 percent by weight of certain water-soluble alkylbenzene sulfonates which have been found to have unusually effective wetting properties in such alkaline solutions, said alkylbenzene sulfonates being characterized by the alkyl radical thereof containing from six to nine carbon atoms.

3,617,208
METHODS AND APPARATUS FOR CLEANING TEXTILES

Manfred Rolf Burger, Munich, Germany, assignor to Daniel Stephen Delany, London, England, a part interest

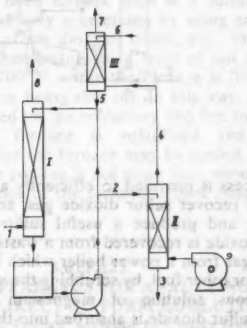
Continuation-in-part of application Ser. No. 725,293, Apr. 30, 1968, now abandoned. This application Nov. 18, 1969, Ser. No. 877,762
Int. Cl. D06l 1/02
U.S. Cl. 8—142 **7 Claims**

Low-boiling solvent is circulated in a dry cleaning apparatus during cleaning from a cleaning tank through a filter to a storage tank and back to the cleaning tank. Mechanical refrigeration units control the temperature and pressure in the apparatus by drawing solvent vapors from the tanks and returning cold liquid solvent to the storage tank. One of the units also condenses the solvent vapors driven out of the cleaned objects by heating after the cleaning step, and makes a vent unnecessary.

3,617,209
PROCESS FOR THE REMOVAL OF HALOGEN-CONTAINING METHANE OR ETHANE DERIVATIVES FROM HYDROCHLORIC ACID

Joachim Massonne, Hannover; Heinrich Paucksch, Langenhagen, and Heinz Wiele, Hannover, all of Germany, assignors to Kali-Chemie Aktiengesellschaft, Hannover, Germany

Filed Sept. 5, 1969, Ser. No. 855,628
Claims priority, application Germany, Sept. 5, 1968, P 17 92 465.1
Int. Cl. C01b 7/08
U.S. Cl. 23—154 **1 Claim**



A process for the removal of small quantities of fluorine and/or chlorine-containing methane or ethane derivatives from hydrochloric acid by passing air through said acid at a temperature between about 0° and 50° C.; preferably the hydrochloric acid and air are contacted countercurrently in a packed column.

3,617,210
PROCESS FOR DYEING POLYAMIDES WITH DYES CONTAINING SULFONIC ACID GROUPS

Johannes Dehnert, Ludwigshafen, and Gerhard Grau, Limburgerhof, both of Germany, assignors to Badische Anilin - & Soda-Fabrik Aktiengesellschaft, Ludwigshafen/Rhine, Germany

Filed Oct. 6, 1969, Ser. No. 864,187
Claims priority, application Germany, Oct. 12, 1968, P 18 02 863.2
Int. Cl. D06p 3/24
U.S. Cl. 8—178 **2 Claims**

A process for dyeing polyamide textile material with acid dyes of the 3-imidazolyl-7-aminocoumarin series.

3,617,211

PHENYL GLYCOL AND SHORT-CHAIN HALOGENATED HYDROCARBON DYE COMPOSITION

Ross R. Dawson, Buffalo, N.Y., assignor to Allied Chemical Corporation, New York, N.Y.

Filed July 8, 1969, Ser. No. 840,019
Int. Cl. D06p 5/04
U.S. Cl. 8—173 22 Claims

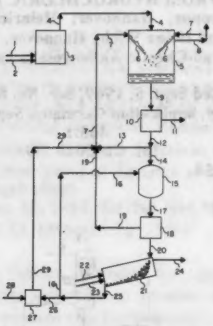
Dyes are dispersed or dissolved in a volatile liquid halogenated short-chain aliphatic hydrocarbon and phenoxy, short-chain alkylphenoxy- or halophenoxy-glycol or -diglycol to make an organic solvent dyeing bath or stock dye solution.

3,617,212

RECOVERY OF SULFUR DIOXIDE FROM WASTE GASES

Indravadan S. Shah, Forest Hills, N.Y., assignor to Chemical Construction Corporation, New York, N.Y.

Filed June 14, 1968, Ser. No. 737,186
Int. Cl. C01b 17/56, 17/72
U.S. Cl. 23—167 6 Claims



A process is provided to efficiently and economically absorb and recover sulfur dioxide gas, and thus eliminate air pollution and produce a useful sulfur-containing product. Sulfur dioxide is recovered from a waste gas stream, such as the flue gas from a power boiler which burns sulfur-containing coal or other fuel, by scrubbing the waste gas stream with an aqueous solution of magnesium bisulfite-magnesium sulfite, Sulfur dioxide is absorbed into the aqueous scrubbing solution by reacting with magnesium sulfite to form magnesium bisulfite in solution. The resulting solution is divided into two portions. Magnesium hydroxide is added to the first portion at a controlled rate, to convert magnesium bisulfite to magnesium sulfite. The first portion is then recycled for further waste gas scrubbing. The magnesium sulfite and magnesium bisulfite content of the second solution portion are processed at elevated temperature to produce magnesium oxide and a gas stream of high sulfur dioxide content, usually about 10 percent by volume. The magnesium oxide is slaked with water to form magnesium hydroxide which is added to the first solution portion, and the gas stream of high sulfur dioxide content is utilized to produce a sulfur-containing product.

3,617,213

COAL TAR METHYL NAPHTHALENE FRACTION AND DIPHENYL CARRIER AND DYEING THEREWITH

Robert Curtis Britt, 2215 Haven Crest Drive, Chattanooga, Tenn., and Frank Arthur Hirsch, 506 E. Brow Road, Lookout Mountain, Tenn.

Filed Dec. 2, 1968, Ser. No. 780,560
Int. Cl. D06p 5/00
U.S. Cl. 8—175 10 Claims

This invention is concerned with a dye carrier and a dyeing process which utilizes said dye carrier. The dye carrier and process are particularly suitable for use in the dyeing of synthetic organic fibers. More specifically this invention is concerned with a dye carrier and process for the dyeing of synthetic organic fibers of the hydrophobic type by the use of a dye carrier which generally comprises biphenyl, methylnaphthalene and an emulsifying agent.

ERRATUM

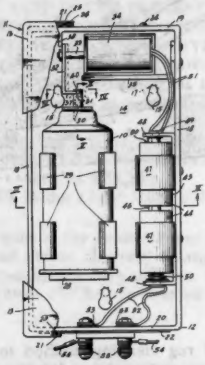
For Class 21—2 see:
Patent No. 3,617,178

3,617,214

DOOR-OPERATED AIR FRESHENER

Raymond E. Dolac, 5756 W. Higgins Road, Chicago, Ill.

Filed Aug. 18, 1969, Ser. No. 850,769
Int. Cl. A61l 9/04
U.S. Cl. 21—77 12 Claims



A door-operated air freshener assembly has a bracket for supporting a pressurized fluent freshening material container having a normally closed supply nozzle and valve structure responsive to operating in response to a thrust supplied thereto through the action of a solenoid momentarily energized by closing of a door-actuated switch.

ERRATUM

For Class 23—154 see:
Patent No. 3,617,209

3,617,215

DRY ACID TREATMENT PROCESS OF ALUMINA-SILICA-TYPE CLAY

Yujiro Sugahara, Tokyo; Masahiro Maeno, Nakajomachi; Shiro Eguchi, Nakajomachi, and Hideaki Kurosaki, Shibata-shi, all of Japan, assignors to Mizusawa Kagaku Kogyo Kabushiki Kaisha, Higashi-ku, Osaka, Japan

Filed Dec. 5, 1967, Ser. No. 688,025
Claims priority, application Japan, Dec. 10, 1966, 41/80962
Int. Cl. C01b 33/18; B01j 11/58
U.S. Cl. 23—182 9 Claims

Process for producing active clay or finely divided silica by intimately admixing an alumina-silica-type clay with 1.0 to 1.5 equivalents of an acid or an aqueous solution thereof, based on the basic metal constituents to be removed, the admixture of said acid or aqueous solution thereof with said clay being in a proportion of 0.3 to 2.5 parts by weight of the former to one part by weight of the latter, based on the dried product of said clay, thereby to form a nonfluid solid reaction product, and thereafter treating said reaction product with an aqueous medium having a pH of not more than 1 to remove by extraction the basic metal constituents contained in said product.

3,617,216
IMPROVED OXIDATION PROCESS FOR THE PRODUCTION OF PIGMENTARY WHITE METAL OXIDES

Kenneth Arkless, Durham; Denis Cleaver, Saltburn, and Alan Lawrence Hare, Durham, all of England, assignors to British Titan Products Company Limited, Durham, England

Filed Dec. 18, 1964, Ser. No. 419,597
Claims priority, application Great Britain, Dec. 24, 1963, 50,954/63
Int. Cl. C01g *1/02, 23/04;* **C09c** *1/36*
U.S. Cl. 23—202 **18 Claims**

There are various methods for the production of white metal oxides such as titanium dioxide in which one or more gas or vapor are heated by passage through an electric arc or electric discharge device. The electrodes have been found to introduce significant impurities into the final product. It has now been found, however, that the discoloring impurities can be very substantially reduced by having at least one of the electrodes and preferably all of the electrodes constructed from a metal such as aluminum, titanium, zirconium, or the alloys thereof or from the electrically conducting nitrides or carbides thereof. Since the impurity results from the oxidation of the electrode, it is essential that the oxides be essentially white or colorless.

3,617,217
PREPARATION OF ANATASE TITANIUM DIOXIDE PIGMENT

Kenneth W. Heywood, Overland, and Charles R. Trampier, Jr., Webster Groves, both of Mo., assignors to National Lead Company, New York, N.Y.

Filed Sept. 22, 1969, Ser. No. 860,016
Int. Cl. C01g *23/04, 23/06, 23/08*
U.S. Cl. 23—202 **4 Claims**

This invention relates in general to a process for preparing a high quality titanium dioxide pigment in which the titanium dioxide is in the anatase crystal form. The process comprises hydrolyzing in a particular manner the titanium values from a titanium sulfate-ferrous sulfate solution in which the concentration of titanium is from 80 to 180 g.p.l. calculated as TiO_2 and treating and calcining the hydrate so formed to produce a high grade anatase TiO_2 pigment. Using the hydrolysis process of the instant invention, a high grade anatase titanium dioxide pigment may be produced from a titanium sulfate-ferrous sulfate solution without utilizing the conventional crystallization step for removing most of the iron values nor the concentration step for increasing the titanium content in the liquor to at least 200 g.p.l. TiO_2.

3,617,218
CATALYTIC SYNTHESIS OF METALLIC HYDRIDES

Eugene E. Van Tamelen, Los Altos Hills, and Robert B. Fechter, Mountain View, both of Calif., assignors to The United States of America as represented by the Secretary of the Department of Health Education and Welfare

Filed Nov. 13, 1968, Ser. No. 775,547
Int. Cl. C01b *6/04*
U.S. Cl. 23—204 **3 Claims**

This invention relates to the catalytic, low temperature (e.g., room temperature) production of sodium hydride and other metallic hydrides from the metal and molecular hydrogen using as catalysts an electron acceptor such as naphthalene and a suitable compound of a transition metal such as titanium tetraisopropoxide.

3,617,219
PURIFICATION OF HYDROGEN PEROXIDE

James A. Cook, Jr., Barberton, and Henry C. Stevens, Akron, both of Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed June 3, 1969, Ser. No. 830,126
Int. Cl. C01b *15/02;* **C07c** *49/68*
U.S. Cl. 23—207 **13 Claims**

Aqueous hydrogen peroxide solutions containing organic impurities, particularly organic esters, are purified by treatment with acid, e.g., phosphoric acid, followed by fractional distillation.

3,617,220
PROCESS FOR CARBONIZING CELLULOSIC FIBROUS SUBSTRATES

Donald R. Moore, Rutherford; Stanley E. Ross, Passaic, and Giuliana C. Tesoro, Dobbs Ferry, all of N.J., assignors to J.P. Stevens & Co., Inc., New York, N.Y.

Division of Ser. No. 721,145, Apr. 15, 1968, Pat. No. 3,527,564.
Filed Mar. 13, 1970, Ser. No. 19,488
Int. Cl. C01b *31/07*
U.S. Cl. 23—209.5 **3 Claims**

A process for improving the thermal carbonization of cellulosic substrates comprising treating said substrates prior to carbonization with a catalytic amount of at least one compound selected from esters of phosphoric acid, esters of phosphorothioic acid, phosphoramidic acids, alkylphosphoramidic acids, alkylphosphonic acids, alkylphosphonothionic acids, and phosphonitrile amide derivatives and heating said treated substrates until a carbonized product having a carbon content of at least 50 percent weight carbon is produced.

3,617,221
PROCEDURE FOR COOLING DOWN SULFUR PLANT FOR INSPECTION

Jimmy D. Egan, Tyler; Homer H. Woodall, Jr., Tyler, Tex., and Lorenz V. Kunkel, Tulsa, Okla., assignors to Pan American Petroleum Corporation, Tulsa, Okla.

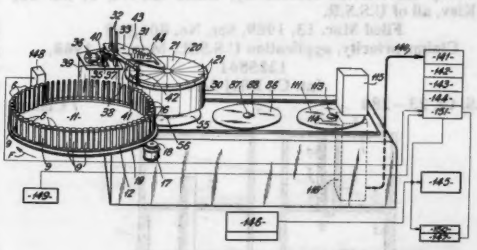
Filed Nov. 12, 1969, Ser. No. 875,847
Int. Cl. C01b *17/04*
U.S. Cl. 23—225 P **10 Claims**

A method is provided by which the procedure for cooling down a refractory lined furnace used in a sulfur recovery plant can be substantially accelerated by using an inert gas such as nitrogen, carbon dioxide, steam, etc., to moderate the burner flame temperature to a level of not more than about 2,600° to 2,700° F. while the furnace is fired on fuel gas–the acid gas flow being shut off. In this way, free sulfur that has accumulated on the refractory and fire brick during operation of the furnace is volatilized and removed therefrom. Thereafter the furnace may be cooled with air at a rate such that the cooling is not more than about 100° per hour until the interior of the furnace is cool enough for inspection.

3,617,222
METHOD AND APPARATUS FOR ANALYZING LIQUID SUBSTANCES LIKELY TO FORM AGGLUTINATES

Claude Matte, Paris, France, assignor to Centre National de la Recherche Scientifique and Centre National de Transfusion Sanguine, Paris, France

Filed May 9, 1968, Ser. No. 728,189
Claims priority, application France, May 11, 1967, 106,180
Int. Cl. G01n *33/16, 31/00*
U.S. Cl. 23—230 R **38 Claims**



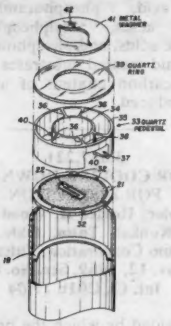
An apparatus and method of testing and classifying materials which contain agglutinates includes mixing samples of the material with one or more reagents, and subjecting the resulting mixtures to at least two agitation operations in a cup-shaped container. One such operation is carried out at high speed to disperse macroagglutinates and the other at low

speed to settle the agglutinates in the center of the cup-shaped container. By inspection of the containers after the agitation operations, and by inspection of comparison samples of the materials in question, properties of the materials under test may be deduced. The principal use of the method is in blood type and group determination. Apparatus is also provided for automatically carrying out the above method.

3,617,223
APPARATUS FOR FORMING MONOCRYSTALLINE RIBBONS OF SILICON

James Claude Boatman, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed May 21, 1968, Ser. No. 730,793
Int. Cl. B01j *17/18*
U.S. Cl. 23—273 SP **19 Claims**

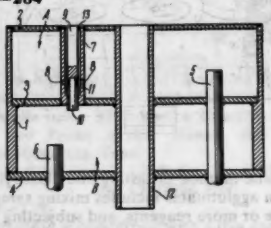


An apparatus for pulling monocrystalline ribbons of silicon from a melt of silicon, which includes a shaping guide, through which the ribbon is pulled, having a heat retentive coating of a material, such as platinum, on the top surface of the guide. The shaping guide preferably includes 45° converging beveled lips on the bottom side thereof oriented toward the melt from which the ribbon is drawn for directing the melt into a rectangular slot formed in the shaping guide near the top surface. The rectangular slot serves to form the silicon in shape of a ribbon. The apparatus also preferably includes a heat reflective member supported above the shaping guide by a quartz pedestal. The heat reflective member serves to assist the coating on the top surface of the shaping guide in maintaining a low temperature differential between the top and bottom surfaces of the shaping guide.

3,617,224
GAS DISTRIBUTION GRID

Avgust Rafaelevich Brun-Tsekhovoi, Ulitsa Garibaldi 21, Korpus 3. kv. 32, Moscow; Valery Fedorovich Varnavsky, Ulitsa Zhigulevskaya, 16, Dnepropetrovsk; Anatoly Markovich Glukhomanjuk, Ulitsa Zhelyabova, 10, kv. 88, Kiev, and Vasily Gavrilovich Kulbachny, Ulitsa Kirova, 9, ku. 55, Kiev, all of U.S.S.R.

Filed Mar. 13, 1969, Ser. No. 806,943
Claims priority, application U.S.S.R., Mar. 18, 1968, 1225841
Int. Cl. B01j *9/14*
U.S. Cl. 23—284 **7 Claims**



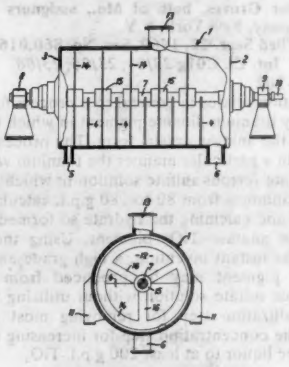
A gas distribution grid for feeding a mixture of combustible and oxidizing gas into a layer of solid granular material, both under atmospheric and elevated pressure, comprising a housing, partitions with mixing pipes built therein, and tubes for the supply of combustible and oxidizing gas to spaces of the grid insulated from each other and defined by said partitions and the grid housing.

The mixing pipes are provided with inserts whereby a linear velocity of the gaseous mixture flow exceeding that of the flame propagation in the mixture is attained in the channels of the mixing pipes feeding the gaseous mixture to the layer of material. This helps preclude the combustion of the mixture in the mixing pipes and in said grip spaces. The gas distribution grid according to the present invention can be used both in the presence of a continuous movement of the solid granular material through the apparatus in which the grid is incorporated and in the absence of such movement.

3,617,225
POLYCONDENSATION APPARATUS

Heinz Kuehne, Oberhoechstadt, Taunus; Manfred Dietze, Offenbach, Taunus, and Franz Hauer, Frankfurt am Main, all of Germany, assignors to Vickers-Zimmer Aktiengesellschaft Planung und Bau von Industrieanlagen

Division of Ser. No. 731,754, May 24, 1968, Pat. No. 3,499,873.
Filed Mar. 21, 1969, Ser. No. 832,874
Claims priority, application Germany, June 22, 1967, 33924
Int. Cl. B01j *1/00*; C08f *1/98*
U.S. Cl. 23—285 **13 Claims**



A reactor for condensation of precondensates in the manufacture of polyester resins and similar high viscosity materials characterized by rotating annular discs within a cylindrical vessel. The discs in cross section are of thin rectangular configuration, and as they rotate, resin picked up on the disc falls from the lower edge of the annulus in a cohesive freely falling film, exposed on both sides to the vapor chamber. Such action greatly accelerates the condensation reaction.

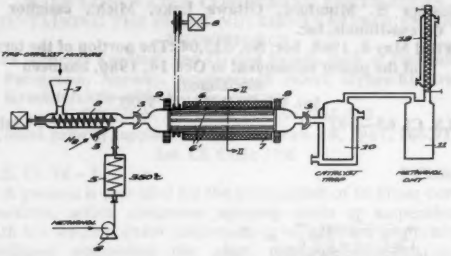
3,617,226
APPARATUS FOR THE CONTINUOUS PREPARATION OF ESTERS

Ferdinand List; Rudolf Strobele, and Gunther Strauss, all of Marl, Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Division of Ser. No. 304,622, Aug. 26, 1963, abandoned.
Filed Apr. 26, 1968, Ser. No. 724,503
Int. Cl. B01j *9/16*; C07c *69/76*
U.S. Cl. 23—288 E **2 Claims**

Apparatus for esterifying terephthalic acid and similar nor-

mally solid organic acids, using a rotary tunnel oven



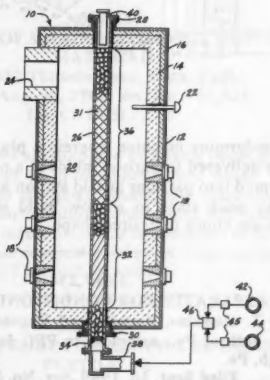
equipped with means for continuously contacting particulate solids with gases.

3,617,227

APPARATUS FOR CATALYTIC REFORMING

Donald Beggs, Toledo, Ohio, assignor to Midland-Ross Corporation, Toledo, Ohio

Filed May 5, 1969, Ser. No. 821,582
Int. Cl. B01j 9/04; C01b 2/16
U.S. Cl. 23—288 M 2 Claims



This disclosure relates to an apparatus for the catalytic reforming of gaseous hydrocarbon that may use steam and/or carbon dioxide as the reforming oxidant. The reforming is accomplished by passing the hydrocarbon and oxidant through a tube which is substantially uniformly heated its entire length and contains refractory preheater particles adjacent the inlet opening and catalytic particles intermediate the preheater particles and the tube outlet. Stoichiometric reforming is achieved without carbon deposition and degradation of the catalyst by employing preheater refractory and catalytic lump particles that are large relative to the size of the tube diameter and the particles have a bulk density of approximately 100 pounds per cubic foot.

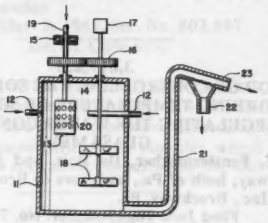
3,617,228

PROCESS FOR MAKING AGGLOMERATES FROM SUSPENSIONS

Jacobus A. J. Smit, Amsterdam, Netherlands, assignor to Shell Oil Company, New York, N.Y.

Filed July 19, 1968, Ser. No. 746,196
Claims priority, application Great Britain, July 20, 1967, 33,335/67
Int. Cl. B01j 1/02
U.S. Cl. 23—313 2 Claims

An apparatus for preparing agglomerates from aqueous suspensions of carbon or coal, or the like, including a vessel with an inlet for suspension and an inlet for auxiliary liquid which is capable of agglomerating the solids in the suspension, and a particle and liquid outlet, the vessel containing a stirrer and a rotating cylindrical chamber having perforations in its curved surface and being adapted to receive suspension feed in the interior of the cylindrical chamber while auxiliary liquid is fed within the vessel, outside of the cylindrical



chamber and near its rotating curved surface. Also disclosed is the process for forming agglomerates by introducing suspension and auxiliary liquid while the cylindrical chamber is rotating and the stirrer is agitating the liquid in the vessel.

3,617,229

PREPARATION OF ALKALI METAL ALUMINUM HYDRIDES

Gunner E. Nelson; Warren E. Becker, and Paul Kobetz, all of Baton Rouge, La., assignors to Ethyl Corporation, New York, N.Y.

Filed Nov. 16, 1967, Ser. No. 683,462
Int. Cl. C01b 6/24
U.S. Cl. 23—365 9 Claims

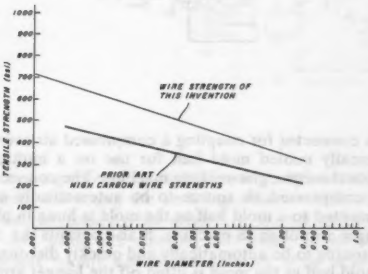
A process for preparing alkali metal aluminum hydride comprising reacting together an alkali metal, or the hydride thereof, with aluminum having alloyed therewith either Ti or Zr, under hydrogen pressure in the presence of a tertiary amine. Preferably, the catalyst comprises a tertiary amine and a hydrocarbon compound which is capable of being metallized under the reaction conditions, such as triphenylmethane, indene, thiophene, fluorene, and alpha-picoline. Reaction times are reduced to about one-third normal and provides for recycling the catalysts and reaction media in which the reaction is conducted. Sodium aluminum hydride prepared by this method is a good source of high-purity hydrogen for use in fuel cells and the like. Reaction temperatures range from 50° C. to 200° C. under pressures of from 500 to 10,000 pounds per square in (p.s.i.).

3,617,230

HIGH-STRENGTH STEEL WIRE

John H. Richards, Pittsburgh, Pa., and Gordon T. Spare, Chardon, Ohio, assignors to United States Steel Corporation

Continuation-in-part of application Ser. No. 584,659, Oct. 6, 1966, now abandoned. This application Apr. 9, 1969, Ser. No. 814,765
Int. Cl. B21c 37/04; C22c 39/44, 39/54
U.S. Cl. 29—193 5 Claims



A steel wire consisting essentially of 0.9 to 1.10% carbon, 0.3 to 0.6% manganese, not more than 0.01% sulfur, not

more than 0.005% phosphorus, not more than 0.1% silicon, and not more than 0.002% nitrogen, cold drawn to a diameter of from 0.25 to 0.001 inch to provide a high tensile strength within the range 350 to 700 K.s.i. and yet exhibiting sufficient ductility as to be characterized by a ductile mode fracture.

3,617,231

METHOD OF CONTROLLING THE SOFTENING POINT AND WORKING TEMPERATURE OF SODA-LIME GLASS BY REGULATING THE WATER CONTENT OF THE GLASS MELT

James E. Fenstermacher, Du Bois, and John R. Le Blanc, Brockway, both of Pa., assignors to Brockway Glass Company, Inc., Brockway, Pa.

Filed June 10, 1968, Ser. No. 735,580
Int. Cl. C03b *5/04*; **C03c** *3/04*
U.S. Cl. 65—134 **8 Claims**

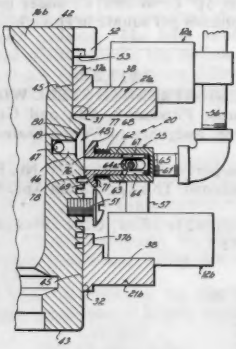
In the continuous melting of batch ingredients to form soda-lime glass, the water content of the molten glass is regulated to control the softening point of the resultant glass and consequently the optimum working temperature. Usually this consists in increasing the water content of the molten glass in an amount sufficient to increase the water content of the resultant glass by at least approximately fifty percent to lower the softening point although, particularly in holding the water content to a predetermined weight percent, the method may involve reducing the water content. The water may be added to molten glass by bubbling steam through the melt, by maintaining the partial pressure of water over the molten glass at a predetermined level, or by varying the batch ingredients so that ingredients having increased available water are present in the batch.

3,617,232

SELF-ACTING CONNECTOR FOR APPLYING COOLANT AIR TO GLASS MOLDS

Robert C. Goodwin, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio

Filed Aug. 31, 1970, Ser. No. 68,329
Int. Cl. C03b *9/14*, *9/38*
U.S. Cl. 65—267 **5 Claims**



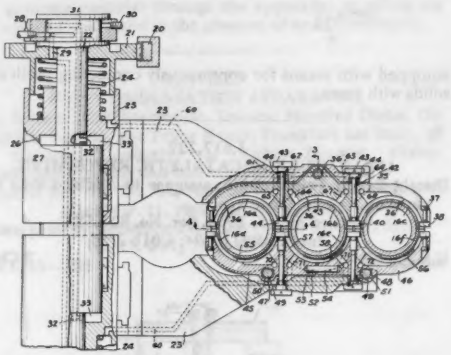
A connector for coupling a compressed air source with an internally cooled mold half for use on a multiple gob individual section glassmaking machine. The connector permits the compressed air source to be automatically and quickly connected to a mold half as the mold is hung in place on the hanger arm of an IS machine. It also permits the compressed air source to be automatically and quickly disconnected from a mold half as the mold is lifted off the hanger arm. The connector is automatic or self-acting in the sense that the connection is made or broken simply by lifting the mold half onto or off the hanger arm; no manual attention to the connection is required.

3,617,233

GLASS-FORMING MACHINE

Eustace H. Mumford, Ottawa Lake, Mich., assignor to Owens-Illinois, Inc.

Filed May 8, 1969, Ser. No. 823,042The portion of the term of the patent subsequent to Oct. 14, 1986, has been disclaimed.
Int. Cl. C03b *11/00*, *9/00*
U.S. Cl. 65—307 **4 Claims**



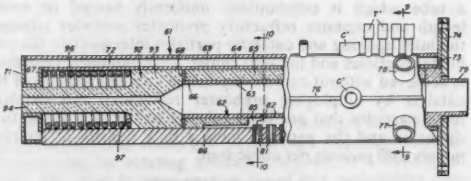
A glass-forming machine wherein a plurality of charges of glass are delivered to parison molds at a parison-molding station, formed into parisons at said station and thereafter transferred by neck rings to a blow mold station wherein the parisons are blown to desired shape.

3,617,234

APPARATUS FOR CONDITIONING GLASS

Charles T. Hawkins, Verona, and Eugene W. Starr, Allison Park, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Sept. 16, 1969, Ser. No. 858,403
Int. Cl. C03b *5/22*, *5/16*
U.S. Cl. 65—337 **38 Claims**



An improved gas impingement manifold for homogenizing a viscous liquid such as molten glass comprises a first inner tube, a second intermediate tube and a third outer tube which are concentrically arranged and mounted such that the first tube serves as a header or conduit for the gas, while the second and third tubes define a cooling jacket. The inner tube is provided with a gas bleed, while a plurality of water-cooled impingement nozzles are fixedly mounted between the second and third tubes.

In a preferred embodiment, the inner tube is composed of at least two axially aligned tube sections whose butt ends are continuously urged into pressing engagement.

3,617,235

PROCESS BY SPRAYING MELTS OR SUSPENSIONS WITH LOW WATER COMPRISING FERTILIZERS CONTAINING THE PLANT NUTRIENTS NITROGEN AND PHOSPHORUS

Isak Andreas Friestad, and Oyvind Skauli, both of Flattenlia, Porsgrunn, Norway, assignors to Norsk Hydro-Elektrisk Kvaelstofaktie-selskab, Oslo, Norway

Filed Feb. 16, 1968, Ser. No. 705,942
Claims priority, application Norway, Feb. 18, 1967, 166,917
Int. Cl. C05c *1/00*
U.S. Cl. 71—1 **9 Claims**

A process is provided for the preparation of fertilizer compositions, which comprises spraying melts or suspensions with low water content, said melts or suspensions comprising fertilizers containing the plant nutrients nitrogen and phosphorous, especially containing ammonium phosphates and ammonium nitrate, the melts or suspensions being mixed with solid potassium salts and possibly with other solid substances before the melt is sprayed through a perforated wall of a centrifuge, whereby the sprayed material is transformed into droplets which are caused to solidify into prills. According to the invention the melt or suspension has a water content less than 5 percent by weight, and the solid substances added to the melt or suspension are grain graded so that more than 7 percent by weight has a grain size exceeding 0.1 mm.

3,617,236

METHOD OF MAKING ORGANIC COMPOST MATERIAL

Elmer E. Elias, 2022 Thibodo Road, Vista, Calif.

Filed Aug. 30, 1968, Ser. No. 756,421
Int. Cl. C05f *11/08*
U.S. Cl. 71—9 **2 Claims**

Organic composts are prepared by mixing finely ground organic material such as grass, manure and bones with raw animal blood from slaughter houses, the resultant mixture ground to a certain moisture content and thereafter mixed and aerated for at least 4 days at a temperature of at least 90 F. to provide a final compost product having a moisture content of about 4 to 12 percent by weight.

3,617,237

PROCESS FOR PRODUCING GRANULAR COMPOUND FERTILIZER

Shigeru Nagasawa; Tsuneaki Nakano, and Kunio Sakashita, all of Sunagawa, Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Filed Dec. 23, 1969, Ser. No. 887,770
Claims priority, application Japan, Jan. 21, 1969, 44/3770
Int. Cl. C05f *11/02*
U.S. Cl. 71—24 **10 Claims**

Improved process for producing granular compound fertilizer comprising mixing humic substance separated from peat with a mixture of starting fertilizer materials, and granulating by tumbling, kneading or extruding the resulting mixture to form the granular compound fertilizer. The humic substance is obtained by disintegrating peat in water to suspend said humic substance and fibrous substance in the water and separating said humic substance from the suspension.

3,617,238

FERTILIZER COMPOSITIONS CONTAINING TETRAISOPROPYLNAPHTHALENE

Seymour W. Ferris, deceased, late of Vincentown, N.J. (by Lucretia G. Ferris, executrix); Ernest P. Black, West Chester, and Andrew J. Bozzelli, Springfield, Pa., assignors to Sun Oil Company, Philadelphia, Pa.

Filed Nov. 24, 1967, Ser. No. 685,712
Int. Cl. C05c *9/00*
U.S. Cl. 71—28 **18 Claims**

This invention relates to novel compositions having improved resistance to liquid water. Specifically the invention relates to slow release fertilizer compositions containing one or more isomers of tetraisopropylnaphthalene.

3,617,239

METHOD FOR PRODUCING MICRONUTRIENT COATED UREA PRILLS AND PRODUCTS

Andrew J. Klanica, Cheshire, and Henry W. Schiessl, Northford, both of Conn., assignors to Olin Mathieson Chemical Corporation

Filed Mar. 3, 1969, Ser. No. 803,997
Int. Cl. C05c *9/00*
U.S. Cl. 71—28 **5 Claims**

Urea prills are reacted with finely divided minor amounts of water-soluble inorganic hydrated salts of micronutrient fertilizer elements and dried to produce a chemically integral coating of urea-micronutrient salt complex which provides micronutrients and anticaking properties to the urea prills.

3,617,240

INHIBITION OF CORROSIVE ACTION OF AQUEOUS AMMONIUM NITRATE-UREA ON FERROUS METALS

Herbert Fleming Scott, Jr., Prince George, Va., assignor to Allied Chemical Corporation, New York, N.Y.

Filed May 21, 1968, Ser. No. 730,897
Int. Cl. C05c *9/00*
U.S. Cl. 71—29 **1 Claim**

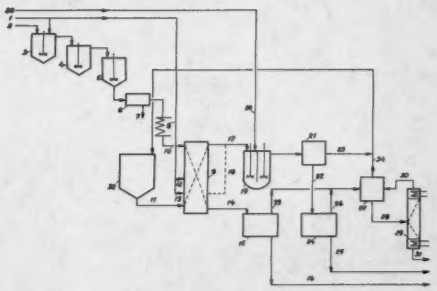
Ferrous metal corrosion by an aqueous solution of ammonium nitrate and urea is inhibited by incorporating at least 0.02 percent P_2O_5, at least 30 percent of which is polymeric phosphate. Ammoniated superphosphoric acid is a source of the polymeric phosphates. The aqueous solution, which is useful as a soil fertilizer, has a pH of 6–7, contains at least 20 percent of each nitrogen ingredient, at least 15 percent water and up to 1 percent free ammonia.

3,617,241

METHOD FOR PREPARING NITROPHOSPHATE FERTILIZER

Vaino Eemil Veijola, Sammaltie 57, Oulu, Finland

Continuation-in-part of application Ser. No. 524,479, Feb. 2, 1966, now abandoned. This application Nov. 25, 1968, Ser. No. 778,442
Int. Cl. C05b *11/06*
U.S. Cl. 71—35 **2 Claims**



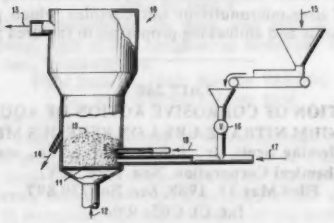
Fertilizers are prepared by dissolving a phosphate mineral in nitric acid, extracting the resulting solution with an organic solvent, neutralizing the solvent or extract phase with ammonia, and using the aqueous salt phase so obtained, which contains mainly ammonium salts of nitric acid and phosphoric acid, as the raw material for nitrophosphate fertilizer. The solvent used in the extraction is recovered by a combination of mechanical separation by settling of azeotropic distillation.

3,617,242

FLUIDIZED BED DEFLUORINATION OF PHOSPHATE ROCK

Clinton Allen Hollingsworth, Lakeland, Fla., assignor to Borden, Inc., New York, N.Y.

Filed Sept. 4, 1968, Ser. No. 757,413
Int. Cl. C05b *13/02*
U.S. Cl. 71—41 5 Claims



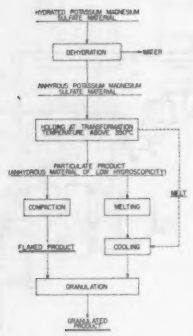
This invention relates to the defluorination of phosphate rock and similar natural phosphatic materials in a fluidized reactor in which there is no reaction between the rock and the defluorinating reagents prior to their addition to the fluidized reactor.

3,617,243

PROCESS FOR THE PRODUCTION OF ANHYDROUS POTASSIUM MAGNESIUM SULFATE MATERIAL WITH LOW HYGROSCOPICITY FROM HYDRATED POTASSIUM MAGNESIUM SULFATE MATERIAL

Ulrich E. G. Neitzel, Ogden, Utah, assignor to Great Salt Lake Minerals & Chemicals Corporation, Ogden, Utah

Filed Mar. 23, 1970, Ser. No. 21,684
Int. Cl. C05d *1/00*
U.S. Cl. 71—63 12 Claims



Hydrated potassium magnesium sulfate mineral material, notably schoenite and/or leonite, is heated sufficiently to drive off substantially all of its crystal water. The dehydrated mineral material is then held at a temperature above about 350° C. for a sufficient duration, usually at least 15 minutes, to substantially decreases the rate of moisture absorption from the atmosphere under storage conditions. Potassium magnesium sulfate which is heat treated in this fashion may be compacted or granulated without substantially increasing its hygroscopicity.

3,617,244

MICROBIOCIDAL COMPOSITIONS

Philip Penry Jones, and Alexander William Davidson, both of London, England, assignors to BDH Chemicals Limited

Filed Mar. 19, 1969, Ser. No. 808,668
Int. Cl. A01n *9/00*
U.S. Cl. 71—67 1 Claim

Microbiocidal compositions comprising solid dichlorophen, sodium carbonate and a sodium silicate, and their use in aqueous systems.

3,617,245

COMPOSITIONS AND METHODS FOR CONTROLLING PLANT GROWTH

Seiichi Ishida, Saitama; Yasuo Kamuro, Saitama; Tadayoshi Takano, Hirakata, and Takashi Iwata, Kyoto, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka-fu, Japan and Nissan Chemical Industries Co., Ltd., Tokyo-to, Japan

Filed Mar. 27, 1967, Ser. No. 625,983
Claims priority, application Japan, Apr. 7, 1966, 41/21454
Int. Cl. A01n *9/24*, A01n
U.S. Cl. 71—76 4 Claims

Compositions and methods for controlling the growth in height of Gramineae plants selectively without producing any metamorphosis in the leaves which employ as the active ingredient m-trifluoromethylphenoxyacetic acid or its salt or ester.

3,617,246

PESTICIDE GRANULES AND METHOD OF PREPARING SUCH GRANULES

Werner Duyfjes, Amsterdam; Willem De Lange, Amsterdam, and Johan Thomas Minnigh, Rotterdam, all of Netherlands, assignors to U. S. Philips Corporation, New York, N.Y.

Filed June 27, 1967, Ser. No. 649,148
Claims priority, application Netherlands, June 28, 1966, June 6, 1967; 6608931, 6707830
Int. Cl. A01n *9/00*
U.S. Cl. 71—79 3 Claims

Pesticidal granules containing a volatile pesticide and a carrier containing a mineral which absorbs water only very slowly.

3,617,247

SEEDS AND TREATMENT THEREOF

James W. Chiles, Jr., P.O. Box 186, Clarksdale, Miss.

Filed Sept. 12, 1967, Ser. No. 667,085
Int. Cl. A01n *21/02*
U.S. Cl. 71—77 6 Claims

Treatment of seeds with materials which not only protect the seeds and seedlings from insect attack but which have been found to accelerate the growth of the seedling and increase the yield of harvestable crop.

3,617,248

SELECTIVE WEED CONTROL WITH HERBICIDAL DIPHENYL-N-(CHLOROPHENOXY-ACETYL)-THIAZONE IMINES

Elmer F. Litzinger, Louisville, Ky., assignor to Allied Chemical Corporation, New York, N.Y.

Filed Mar. 19, 1969, Ser. No. 808,659
Int. Cl. A01n *9/12*
U.S. Cl. 71—90 2 Claims

2,3-Diphenyl-N-(chlorophenoxyacetyl)-thiazone imines are prepared by reacting S-cyanomethylisothio-benzanilide with a di- or tri- chlorophenoxyacetyl chloride, preferably in an inert solvent, to form the hydrochlorides of these N-acyl derivatives. Neutralization of the hydrochlorides gives the free bases. The compounds are useful as herbicides.

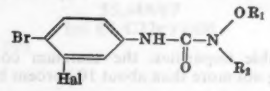
3,617,249

METHOD FOR COMBATING WEEDS IN CROP CULTURES

Henry Martin, Basel; Hans Aebi, Reihen, and Ludwig Ebner, Stein, Aargau, all of Switzerland, assignors to Ciba Limited, Basel, Switzerland

Division of Ser. No. 543,541, Apr. 19, 1966, Patent No. 3,497,541, which is a continuation-in-part of Ser. No. 191,442, May 1, 1962, Patent No. 3,288,851.
Filed Oct. 2, 1969, Ser. No. 870,916
Int. Cl. A01n *9/24*
U.S. Cl. 71—120 23 Claims

This invention relates to the use as herbicides of compounds having the formula



wherein Hal represents bromine or chlorine and R_1 and R_2 each represents a lower alkyl.

3,617,250

HERBICIDAL TRIFLUOROMETHYL-1,3-PHENYLENEDIAMINE COMPOUNDS

William G. Woods, Fullerton; Don L. Hunter, Anaheim; James D. Stone, Whittier, and Cecil W. Le Fevre, Anaheim, all of Calif., assignors to United States Borax & Chemical Corporation, Los Angeles, Calif.

Filed Apr. 1, 1969, Ser. No. 812,357
Int. Cl. A01n *9/22;* A01n *13/00*
U.S. Cl. 71—121 15 Claims

N,N'-Substituted-1,3-phenylenediamine compounds having a trifluoromethyl and a nitro group on the aromatic ring. The compounds are useful as herbicides.

3,617,251

HERBICIDAL HALODINITRO-1,3-PHENYLENEDIAMINE COMPOUNDS

Don L. Hunter, Anaheim; William G. Woods, Fullerton; James D. Stone, Whittier, and Cecil W. LeFevre, Anaheim, all of Calif., assignors to United States Borax & Chemical Corporation, Los Angeles, Calif.

Filed Nov. 10, 1969, Ser. No. 875,507
Int. Cl. A01n *9/20*
U.S. Cl. 71—121 16 Claims

2,4-Dinitro-6-halo-1,3-phenylenediamine compounds having at least one N-substituent are useful as herbicides.

3,617,252

HERBICIDAL DINITRO-1,3-PHENYLENEDIAMINE COMPOUNDS

Don L. Hunter, Anaheim; William G. Woods, Fullerton; James D. Stone, Whittier, and Cecil W. LeFevre, Anaheim, all of Calif., assignors to United States Borax & Chemical Corporation, Los Angeles, Calif.

Continuation-in-part of application Ser. No. 812,307, Apr. 1, 1969. This application Nov. 10, 1969, Ser. No. 875,508
Int. Cl. A01n *13/00, 9/22, 9/20*
U.S. Cl. 71—121 19 Claims

2,4-Dinitro-1,3-phenylenediamine compounds having a trifluoromethyl group on the aromatic ring. The compounds are useful as herbicides.

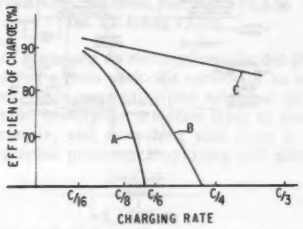
3,617,253

PRODUCTION OF METAL POWDERS, PARTICULARLY FOR USE IN ELECTRODES AND PRODUCTION OF ELECTRODES FROM THESE PRODUCTS

Bernard Paul Louis Amiet, Bordeaux, France, assignor to Societe Des Accumulateurs Fixes et de Fraction (Societe Anonyme), Seine-Saint-Denis, France

Filed Dec. 13, 1968, Ser. No. 783,505
Claims priority, application France, Dec. 18, 1967, 132,741
Int. Cl. B22f *9/00, 3/12, 5/00*
U.S. Cl. 75—0.5 A 10 Claims

Process for manufacturing a metal powder having a predetermined structure consisting in chemically reducing to metallic state a solution of a salt of the metal intended to constitute the electrode by the addition thereto of an appropriate reducing agent, while the "solution-reducing agent" mixture is submitted to a perturbed whirling agitation, so that the concentration of salt and reducing agent are made uniform and so that a great number of metal germs are produced, the agitation being maintained in order to promote



an agglomeration in successive concentric layers of particles until the predetermined size of conglomerates is obtained, then separating the conglomerates from the mother-liquid when the required size is reached and finally washing and drying the powder so prepared. The powder so prepared is then formed into electrodes of desired dimensions by compression and, if necessary, followed by subsequent sintering at moderate sintering temperature.

3,617,254

METHOD OF MAKING ORE AGGLOMERATES

Louis George Imperato, Jr., Tenafly, N.J., assignor to Blocked Iron Corporation

Continuation-in-part of Ser. No. 672,003, Oct. 2, 1967, which is a continuation-in-part of Ser. No. 374,191, June 10, 1964, Patent No. 3,382,063.
Filed Mar. 12, 1969, Ser. No. 806,672The portion of the term of the patent subsequent to May 7, 1985, has been disclaimed.
Int. Cl. C21b *1/24*
U.S. Cl. 75—3 3 Claims

A method is provided for producing lump metal ores by admixing the finely divided ore with an alkaline earth oxide or hydroxide and a carbonaceous material, forming the mixture into lumps and reacting it with carbon dioxide in the presence of moisture to form alkaline earth carbonates in situ in the lumps.

3,617,255

PROCESS FOR REPRESSING SULFUR TRIOXIDE FORMATION IN IRON SULFIDE ROASTING

Johan Elof Wiklund, Halsingborg, Sweden, assignor to Boliden Aktiebolag, Stockholm, Sweden

Filed Apr. 25, 1968, Ser. No. 724,263
Int. Cl. C21b *1/02;* C22b *1/10*
U.S. Cl. 75—9 1 Claim

A process for magnetite-yielding roasting of sulfide-containing materials for repressing the formation of SO_3 in the resulting roaster gas; the process comprising the step of introducing an oxygen-containing gas into the roaster gas for combustion of elementary sulfur at a gas temperature of below 420° C. but not below the temperature at which the sulfur content of the roaster gas begins to condensate.

3,617,256

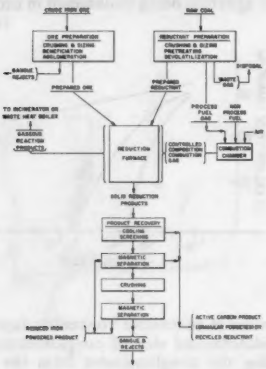
PROCESS FOR SIMULTANEOUSLY PRODUCING POWDERED IRON AND ACTIVE CARBON

Robert T. Joseph, Richboro, Pa.; Jack Trechock, Woodbury Heights, N.J.; Erik Saller, Stamford, Conn., and Josiah Work, Harlingen, Tex., assignors to FMC Corporation, New York, N.Y.

Filed Feb. 28, 1968, Ser. No. 708,872
Int. Cl. C21b *13/00*
U.S. Cl. 75—36 9 Claims

Iron, in the form of iron powder or a soft readily powdered agglomerate thereof, is prepared simultaneously with powdered active carbon, by heating an iron oxide, in the form of powder or a soft readily powdered agglomerate thereof with

a stoichiometric excess of a powdered coal char which will react with carbon dioxide at the temperature employed at a rate above 10 percent per hour, at a temperature controlled so that the charge is maintained throughout the reaction at between 1,775° F. and 1,875° F. The temperature is most



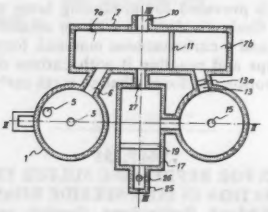
readily maintained in production units by passing the gases used to supply the necessary extraneous heat across the path of travel of the charge, rather than along the path of travel.

3,617,257

PROCESS FOR CONTINUOUSLY REFINING METAL

Jean Rouanet, Metz, France, assignor to Institut DeRecherches De LaSiderurgie Francaise, Saint Germain-en-Laye (Yvelines), France

Filed Mar. 11, 1968, Ser. No. 712,005
Claims priority, application France, Mar. 13, 1967, 98,464
Int. Cl. C21b *13/14;* **C21c** *5/36*
U.S. Cl. 75—46 **4 Claims**



A process for continuously refining metal in at least two stages in which partly refined metal and slag formed in a first refining vessel is passed into a first decanting vessel adjacent thereto in which the slag is separated from the partly refined metal and the latter fed into a second refining vessel and the further refined metal and slag produced therein is fed into a second decanting vessel from which the metal is discharged while the slag is passed back into the first decanting vessel to react with the partly refined metal and slag therein, and an apparatus for performing the above process.

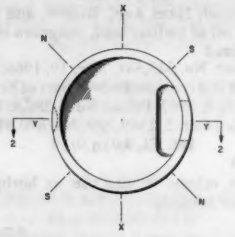
3,617,258

HEAT RESISTANT ALLOY STEEL

Hideki Terada, Aki-gun, Horoshima-ken, Japan, assignor to Toyo Kogyo Company Limited, Aki-gun, Hiroshima-ken, Japan

Filed Oct. 18, 1967, Ser. No. 676,172
Claims priority, application Japan, Oct. 21, 1966, 41/69550
Int. Cl. C22c *39/20*
U.S. Cl. 75—126 C **1 Claim**

A heat-resistant alloy steel composed of 0.05 to 0.40 percent by weight of carbon, 0.5 to 1.0 percent by weight of silicon, 0.2 to 1.0 percent by weight of manganese, 20.0 to 23.0 percent by weight of chromium, 0.5 to 2.5 percent by weight of molybdenum, 0.5 to 3.5 percent by weight of tungsten, 0.5 to 3.5 percent by weight of niobium, and the balance iron



and unavoidable impurities, the tantalum content in the niobium being not more than about 10 percent by weight.

3,617,259

PROCESS OF MAKING CAST IRON OF IMPROVED STRENGTH AND MACHINING PROPERTIES

Heinz-Ulrich Doliwa, Friedberg, Hessin, Germany, assignor to Deutsche Gold-Und Silber Scheideanstalt vormals Roessler, Frankfurt am Main, Germany

Filed Mar. 18, 1969, Ser. No. 808,301
Claims priority, application Germany, Mar. 20, 1968, P 17 58 004.0
Int. Cl. C22c *33/00*
U.S. Cl. 75—130 R **10 Claims**

For making cast iron, a nucleating agent is added to the superheated melt consisting of highly dispersed silica or an alumina-silica or titaniumdioxide-silica mixed oxide containing at least 90 percent silica. A cast iron of improved strength and machining properties is obtained.

3,617,260

MAGNETIC ALLOY

Klaus Detert, Niederrod, Germany, assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation-in-part of application Ser. No. 584,368, Oct. 5, 1966, now abandoned. This application Apr. 30, 1969, Ser. No. 820,655
Int. Cl. C22c *19/00;* **H01f** *1/04, 1/14*
U.S. Cl. 75—170 **10 Claims**

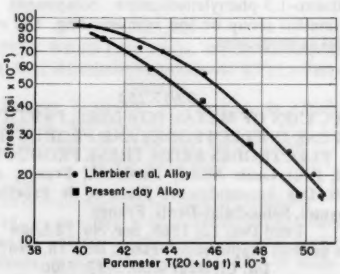
A cobalt base alloy is described having highly desirable mechanical and magnetic properties which alloy is suited for use at temperatures of up to 750° C. The cobalt base alloy contains nickel, iron, aluminum, tantalum, zirconium and boron, and optionally may contain titanium, niobium and beryllium.

3,617,261

WROUGHT NICKEL BASE SUPERALLOYS

Louis W. Lherbier, Cuddy, and Frank J. Rizzo, Pittsburgh, both of Pa., assignors to Cyclops Corporation Specialty Steel Division, Bridgeville, Pa.

Filed Feb. 8, 1968, Ser. No. 703,978
Int. Cl. C22c *19/00*
U.S. Cl. 75—171 **5 Claims**



A wrought nickel base superalloy having an exacting combination of tungsten, tantalum, aluminum, nickel, boron, zir-

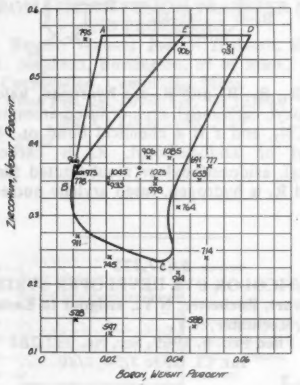
conium, carbon, manganese, silicon, chromium, cobalt, molybdenum, and titanium for minimization of deleterious phase formations and a resultant alloy capable of being hot worked and having good strength properties at high temperatures.

3,617,262

NICKEL-CHROMIUM-TANTALUM ALLOYS

Stuart Walter Ker Shaw, Wylde Green, Sutton Coldfield, and Peter John Penrice, Hollywood, Birmingham, both of England, assignors to The International Nickel Company, Inc., New York, N.Y.

Filed Dec. 4, 1968, Ser. No. 781,043
Claims priority, application Great Britain, Dec. 6, 1967, 55,449/67
Int. Cl. C22c *19/00*
U.S. Cl. 75—171 **8 Claims**



An alloy having in the cast form, high-stress-rupture strength together with good impact resistance, contains, for example, about 0.1 percent carbon, about 3 percent chromium, about 19 percent tungsten, about 3 percent tantalum (replaceable in part by columbium), about 5.7 percent aluminum about 12 percent cobalt, about 0.03 percent boron, and about 0.37 percent zirconium, the balance being essentially nickel.

3,617,263

CORROSION-RESISTANT NICKEL-CHROMIUM BASE ALLOY

Paul Isidore Fontaine, Shirley, Solihull; Michael John Fleetwood, Berkhamsted, and Harry Lewis, Northfield, Birmingham, all of England, assignors to The International Nickel Company, Inc., New York, N.Y.

Filed June 5, 1969, Ser. No. 830,848
Claims priority, application Great Britain, June 11, 1968, 27,671/68
Int. Cl. C22c *19/00*
U.S. Cl. 75—171 **11 Claims**

A nickel-chromium base alloy adapted for turbine blade manufacture contains, in addition to nickel and chromium, cobalt and correlated amounts of niobium, titanium and aluminum, as well as carbon and boron. Other elements such as zirconium, rare earth metal and yttrium can be present.

3,617,264

HIGH-TEMPERATURE OXIDATION-RESISTANT COBALT BASE ALLOYS

Adrian M. Beltran, and Chester T. Sims, both of Ballston Lake, N.Y., assignors to General Electric Company

Filed Dec. 30, 1969, Ser. No. 889,344
Int. Cl. C22c *19/00*
U.S. Cl. 75—171 **3 Claims**

Cobalt base alloys having improved high-temperature strength, ductility, and oxidation resistance consist essentially of, in percent by weight, chromium 20–35, carbon 0.05–1.5, tungsten 2–12, tantalum an effective amount of about 1 up to 7, iron 3–17, boron an effective amount of about 0.005 up to 0.1, yttrium 0.05–0.4, titanium an effective amount of about 0.1 up to 3, zirconium an effective amount of about 0.1 up to 3, with the remainder essentially cobalt except for impurities.

3,617,265

METHOD FOR PREPARING A RESIN OVERCOATED ELECTROPHOTOGRAPHIC PLATE

Nicholas L. Petruzzella, Columbus, Ohio, assignor to Xerox Corporation, Rochester, N.Y.

Filed Aug. 29, 1966, Ser. No. 575,636
Int. Cl. G03g *13/22*
U.S. Cl. 96—1 **7 Claims**

A method of preparing an electrophotographic plate which comprises coating a resin upon the surface of an amorphous selenium layer while permitting the selenium to devitrify, curing said resin, heating the selenium layer to about its softening temperature, and quenching said layer is disclosed. Electrophotographic processes employing said plate are also disclosed.

3,617,266

PROCESS FOR PREPARING A PLANOGRAPHIC PRINTING FORM

Jozef Frans Willems, Wilrijk; Jozef Leonard Van Engeland, St. Katelijne-Waver, and Noel Jozef De Volder, Edegem, all of Belgium, assignors to Gevaert-Agfa N.V., Mortsel, Belgium

Filed Mar. 6, 1968, Ser. No. 710,723
Claims priority, application Great Britain, Mar. 6, 1967, 10476/67
Int. Cl. G03g *13/22*; **G03f** *7/02*
U.S. Cl. 96—1 **9 Claims**

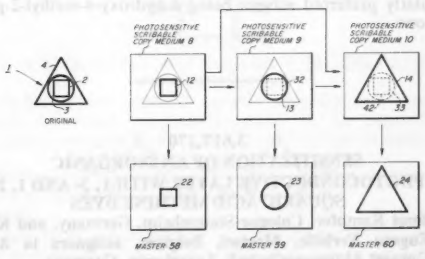
A planographic printing plate prepared by electrostatic exposure and development and carrying a hydrophobic deposit from such development in the image areas thereof is hydrophilized by treatment with an aqueous solution containing a polymeric compound having in the recurring units thereof an amino salt and/or quaternary salt group the polymer compound being free of long chain hydrocarbon groups. Preferred hydrophilizing compounds are polyamines having aliphatic linkages between the amino groups and polyvinyl compounds having hydrogen-containing heterocyclic side groups.

3,617,267

PROCESS FOR FORMING A SERIES OF MASTERS IN REGISTER

William C. Kinney, Littleton, Mass., assignor to Itek Corporation, Lexington, Mass.

Filed Apr. 24, 1969, Ser. No. 819,075
Int. Cl. G03g *5/00*; **G03c** *5/04*
U.S. Cl. 96—1 **16 Claims**



A process is disclosed for forming a series of masters which reproduce in register selected portions of an original by using a plurality of photosensitive scribable copy media which can be updated. A visible image of the original is formed on each piece of photosensitive scribable copy medium and then an area of the scribable coating is scribed on one of the media corresponding to a selected portion of the original for which a separate master is to be formed. A visible image of the

previously scribed area is then formed on another copy medium thereby updating said copy medium. If more than two masters are to be formed, the scribing and updating steps are repeated for each additional portion of the original for which a separate master is to be formed, except for the last of these portions. For the last portion, only the scribing step is repeated.

3,617,268

ELECTROPHOTOGRAPHIC MATERIALS

Yoshinobu Murakami, and Kazuhisa Morimoto, both of Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Osaka, Japan

Filed Jan. 20, 1970, Ser. No. 4,200
Claims priority, application Japan, Jan. 30, 1969, 44/7501
Int. Cl. G03g 5/06
U.S. Cl. 96—1.5 7 Claims

A photosensitive material for electrophotography comprising an organic photoconductive compound and a sensitizer consisting of reaction products of a benzopyrylium salt and a benzopyrane.

3,617,269

SPECTRALLY SENSITIZED PHOTOCONDUCTIVE RECORDING MATERIAL

Karel Eugeen Verhille, Mortsel; Robert Joseph Noe, Mortsel; Luciaan Frans Voet, St. Katelijne-Waver, and Henri De Poorter, Mortsel, all of Belgium, assignors to Gevaert-Agfa N.V., Mortsel, Belgium

Filed Apr. 26, 1968, Ser. No. 724,586
Claims priority, application Great Britain, Apr. 26, 1967, 19187/67
Int. Cl. G03c 5/02, 5/04
U.S. Cl. 96—1.7 4 Claims

Photoconductive zinc oxide for electrophotographic purposes is spectrally sensitized with methine dyes wherein the methine linkage connects two oxazole nuclei as such or forming part of a fused benzo-, naphto-, or furo-ring. The nuclei may be substituted with certain designated substituents. The photoconductive zinc oxide so sensitized is preferably applied from an aqueous coating medium to which the sensitizing agent was incorporated in the form of a solution thereof in an organic solvent which has a very low vapor pressure and is miscible with water in substantial proportions, a particularly preferred solvent being 4-hydroxy-4-methyl-2-pentanone.

3,617,270

SENSITIZATION OF AN INORGANIC PHOTOCONDUCTIVE LAYER WITH 1, 3- AND 1, 2-SQUARIC ACID METHINE DYES

Helmut Kampfer, Cologne-Stammheim, Germany, and Karel Eugeen Verhille, Mortsel, Belgium, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed June 16, 1969, Ser. No. 833,668
Claims priority, application Germany, June 20, 1968, P 17 72 688.4
Int. Cl. G03g 5/00, 7/00
U.S. Cl. 96—1.7 2 Claims

Electrophotographic material comprising a support layer and a photoconductive layer, the latter comprising an inorganic photoconductor in a film-forming binder. The photoconductor is sensitized by 1, 3- or 1, 2-quadratic acid methine dyes.

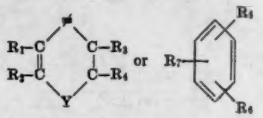
3,617,271

SENSITIZERS HAVING ONE OR MORE ELECTRON-WITHDRAWING GROUPS FOR ORGANIC PHOTOCONDUCTORS

Albert Lucien Poot, Kontich; Walter August Van den Heuvel, Berchem; Johannes Josephus Vanheertum, Hallezandhoven, and Karel Eugeen Verhille, Mortsel, all of Belgium, assignors to Gevaert-Agfa N.V., Mortsel, Belgium

Filed June 10, 1969, Ser. No. 831,994
Claims priority, application Great Britain, June 10, 1968, 27,525/68
Int. Cl. G03g 5/00
U.S. Cl. 96—1.5 7 Claims

An electrophotographic material comprising an organic photoconductor and as a sensitizer, a compound of the following formulas:



wherein: R_1, R_2, R_3 and R_4 are hydrogen, halogen, nitro, cyano, carboxyl, carbamoyl, aryl, or fused aromatic nuclei; Y is CH_2 or CN_2, and z is a chemical bond or $-SO_2-$; R_5 is azidosulfonyl or azidocarbonyl, R_6 is carboxyl, sulfo, azidocarbonyl, azidosulfonyl or a substituted fused arylene nucleus, and R_7 is hydrogen, fused arylene nucleus or other substituent.

3,617,272

MULTICOLOR DYE DEVELOPER SYSTEMS

Paul H. Stewart, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 6, 1969, Ser. No. 797,283
Int. Cl. G03c 5/54, 1/40
U.S. Cl. 96—3 16 Claims

Photographic elements wherein at least two adjacent image-forming units (each comprising silver halide and dye developer) are separated by an alkali-permeable, water-insoluble stratum of a polyvalent metal salt and a film-forming, alkali-permeable, water-soluble polymer having free carboxylic acid groups, are processed in the presence of a material that is a chelating agent for the polyvalent metal, the chelating function of said material being destroyed imagewise in just exposed areas as a function of development.

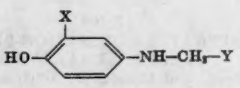
3,617,273

COMPETING COLOR DEVELOPER PROCESS AND COMPOSITION

Atsuaki Arai; Mitsugu Tanaka; Haruhiko Iwano, and Isao Shimamura, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed June 20, 1969, Ser. No. 835,224
Claims priority, application Japan, June 20, 1968, 43/42841
Int. Cl. G03c 7/16, 7/00, 5/50
U.S. Cl. 96—22 11 Claims

A novel competing color-developing agent having the formula:



wherein X is hydrogen, alkyl, hydroxylalkyl, phenyl or halogen, and Y is a substituted or unsubstituted N, S or O containing heterocyclic ring, and process for the use thereof.

3,617,274

HARDENED GELATIN HOLOGRAPHIC RECORDING MEDIUM

Lawrence H. Lin, Chatham Township, Morris County, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 29, 1968, Ser. No. 717,207
Int. Cl. G03c 5/04, 9/00
U.S. Cl. 96—27 H 5 Claims

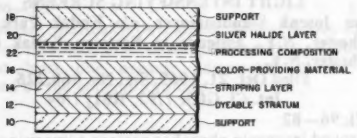
A holographic recording medium comprising a hardened gelatin film sensitized with a chromate or dichromate. Exposure effects a change in the index of refraction in the exposed areas of the film, which can then be used without further processing, or washed to remove the sensitizer to make a permanent record.

3,617,275

DIFFERENTIAL COLOR MOIETY MOBILITY IN MONOCHROMATIC DIFFUSION-TRANSFER ELEMENTS AND PROCESSES

Stanley M. Bloom, Waban; Joel M. Peisach, Hudson, and Robert K. Stephens, Burlington, all of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Feb. 20, 1970, Ser. No. 12,944
Int. Cl. G03c 7/00, 5/54
U.S. Cl. 96—29 D 15 Claims



Novel systems for preparing dye images utilizing novel elements including a dyeable stratum and a layer containing a color-providing material which is nondiffusible but upon oxidation can release a diffusible color-providing moiety for transfer to the dyeable stratum to impart thereto a color transfer image.

3,617,276

SILVER COMPLEX DIFFUSION TRANSFER PROCESS SEPARATING DEVELOPMENT NUCLEI AND ALKALINE LIQUID

Louis Maria De Haes, Edegem, Belgium, assignor to Gevaert-AGFA, N.V., Mortsel, Belgium

Filed Jan. 11, 1968, Ser. No. 697,005
Claims priority, application Great Britain, Jan. 11, 1967, Nov. 8, 1967, 57,642/67, 50899/67
Int. Cl. G03c 5/54
U.S. Cl. 96—29 5 Claims

Silver complex diffusion transfer reproduction process in which a liquid containing development nuclei and an aqueous alkaline liquid for diffusion transfer image formation are applied separately and in sequential order to a light-sensitive material carrying a silver halide emulsion layer after which the latter material is contacted while still moist with an image-receiving material. The photographic developing agent for the silver halide emulsion is provided via one or both of the light-sensitive and image-receiving materials so that the alkaline liquid can be free of such agent. The light-sensitive material carries a water-permeable hydrophilic colloid layer superimposed upon the emulsion layer. The development nuclei are dispersed in the carried liquid therefor which contains only an amount of hydrophilic colloid sufficient for maintaining the nuclei in dispersion.

3,617,277

DYE DEVELOPER DIFFUSION TRANSFER SYSTEMS

Paul H. Stewart, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of application Ser. No. 676,603, Oct. 19, 1967, now abandoned. This application Feb. 6, 1969, Ser. No. 797,282
Int. Cl. G03c 5/54, 1/40
U.S. Cl. 96—29 D 20 Claims

In dye developer diffusion transfer systems in which chelatable metal ions are present during processing, the processing is conducted in the presence of a catechol silver halide developing agent and a compound which is a more effective chelating agent for the chelatable metal ions than catechol.

3,617,278

AZIDE SENSITIZERS AND PHOTOGRAPHIC ELEMENTS

Colin Holstead, Abbotts Langley, England, and Wojciech Maria Przezdziecki, Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 20, 1968, Ser. No. 714,431
Claims priority, application Great Britain, Mar. 31, 1967, 14,955/67
Int. Cl. G03f 7/08; G03c 1/52
U.S. Cl. 96—33 15 Claims

A light-sensitive azido substituted trihalomethane compound is employed in photographic elements with a polymer wherein both positive or negative images are obtained with utility in photomechanical reproduction and photoresist applications.

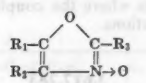
3,617,279

PHOTOPOLYMERIZATION OF ETHYLENICALLY UNSATURATED ORGANIC COMPOUNDS EMPLOYING AN OXIDO-OXAZOLE, PHOTOPOLYMERIZABLE COATED ELEMENT AND METHOD OF USING

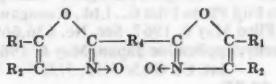
Urbain Leopold Laridon, Wilrijk, and Gerard Albert Delzenne, 'S-Gravenwezel, both of Belgium, assignors to Gevaert-AGFA N.V., Mortsel, Belgium

Filed Nov. 13, 1968, Ser. No. 775,494
Claims priority, application Great Britain, Dec. 4, 1967, 55085/67
Int. Cl. G03c 5/00, 1/68
U.S. Cl. 96—35.1 7 Claims

A photopolymerization process comprising irradiating with light of wave lengths ranging from 2,500 to 4,000 Angstroms, a composition comprising a photopolymerizable ethylenically unsaturated organic compound, and an oxido-oxazole photopolymerization initiator having a structural formula:



and



wherein each of R_1, R_2 and R_3 is selected from the group consisting of alkyl groups of one to three carbon atoms, and an aryl group, and R_4 is selected from an alkyl group of two to three carbon atoms, and an aryl group, these oxido-oxazoles being present in the form of the free bases or in the form of their hydrochlorides; and photopolymerizable elements comprising a support, an ethylenically unsaturated organic compound, and an oxido-oxazole as set forth, are described. The oxido-oxazole initiators provide fast and effective polymerization.

3,617,280

SILVER BROMIDE EMULSION SENSITIZED WITH 1,4, TRIAZINES

Harald Huckstadt, Cologne, Stammheim, Germany; Wilhelm Saleck, Schildgen, Germany; August Randolph, Leverkusen, Germany; and Erwin Ranz, Leverkusen, Germany, assignors to AGFA–Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed, Apr. 22, 1969, Ser. No. 818,381
Claims priority, application Germany, May 6, 1968, P 17 72 375.0
Int. Cl. G03c *5/30, 1/28*
U.S. Cl. 96—66.3 10 Claims

The present invention relates to a process for increasing the sensitivity of photographic silver bromide emulsions by developing the emulsions in the presence of thiomorpholine compounds.

3,617,281

PRINTING OF LENTICULAR FILMS

Gregory E. Lindin, Wellesley Hills, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of application Ser. No. 547,251, May 3, 1966, now Patent No. 3,504,970. This application Jan. 30, 1970, Ser. No. 6,991
Int. Cl. G03c *9/00*
U.S. Cl. 96—40 3 Claims

A selected portion of a photosensitive element comprising a lenticular surface may be exposed by forming said element into an arc while said element is moving through an exposure area and exposing said photosensitive element to a source of radiation actinic thereto, said source being so placed as to be incident only upon a preselected portion of said photosensitive material.

3,617,282

NUCLEATING AGENTS FOR PHOTOGRAPHIC REVERSAL PROCESSES

Charleton C. Bard; Arthur D. Kuh, and Richard J. Malloy, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of application Ser. No. 803,941, Mar. 3, 1969, now abandoned. This application May 18, 1970, Ser. No.38,492
Int. Cl. G03c *5/50*
U.S. Cl. 96—59 12 Claims

Chelated stannous ion silver halide nucleating agents are used in photographic reversal processes. The nucleating agents are useful in reversal developer solutions or in prebaths employed prior to reversal development. The nucleating agents are especially useful for processing multilayer color products where the emulsion layers contain color couplers or for selective reversal processing of multilayer color products where the couplers are present in the color developing solutions.

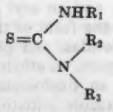
3,617,283

SIMULTANEOUS BLEACH-FIXING METHOD IN COLOR PHOTOGRAPHY

Reiichi Ohi; Hiroyuki Amano; Haruhiko Iwano, and Kazuo Shirasu, all of Ashigara-kamigun, Kanagawa, Japan, assignors to Fuji Photo Film G., Ltd., Kanagawa, Japan

Filed May 8, 1967, Ser. No. 636,669
Claims priority, application Japan, May 6, 1966, 41/28377
Int. Cl. G03c *5/30, 5/32*
U.S. Cl. 96—60 BF 4 Claims

In processing photographic light-sensitive color material, bleaching can be promoted without the occurrence of color stains by incorporating, in a bleach-fixing solution containing a water-soluble iron complex salt or a processing solution, between color development and bleach-fixing a compound shown by the general formula



where R_1 and R_2 are an alkyl group, an hydroxyalkyl group, an aryl group, or an allyl group, or R_1 and R_2 can form together a hetrocyclic ring, and R_3 is an alkyl group, an hydroxyalkyl group or an allyl group when R_1 and R_2 do not form a heterocyclic ring and is hydrogen, an alkyl group or an hydroxyalkyl group when R_1 and R_2 form a heterocyclic ring.

3,617,284

DEVELOPMENT PROCESS FOR LITH-TYPE EMULSION WITH N-VINYL 2-PYRROLIDONE POLYMER

Joseph Louis De Munck, Kalmthout, and Raymond Leopold Florens, Edegem, both of Belgium, assignors to Gevaert-AGFA, N.V., Mortsel, Belgium

Filed Sept. 18, 1967, Ser. No. 668,686
Claims priority, application Great Britain, Nov. 19, 1966, 41,638/66
Int. Cl. G03c *5/30*
U.S. Cl. 96—66 9 Claims

A process for developing a light-sensitive silver halide photographic material containing a negative silver halide emulsion layer of the lith-type comprising the steps of developing the material in the presence of an N-vinyl-2-pyrrolidone polymer with an aliphatic aldehyde or ketone-bisulfite/hydroquinone developer containing alkylene oxide units is described. The process results in a steeper gradation and consequently improved dot sharpness of the screen image. Additionally, a broader development time interval wherein reproducible dot screen images is obtained.

3,617,285

LIGHT INTENSIFYING SCREENS

William Joseph Staudenmayer, c/o Kodak Park Division, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 21, 1969, Ser. No. 868,225
Int. Cl. G03c *1/92;* H01j *1/64*
U.S. Cl. 96—82 18 Claims

Improved inorganic phosphor screens comprising a support bearing a layer comprising a binder comprising a mixture of macromolecular bisphenol polycarbonates and copolymers comprising said bisphenol polycarbonates and poly(alkylene oxides) are described for radiographic use. Radiographic film-screen combinations are also disclosed.

3,617,286

PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL HAVING A BACK LAYER

Koji Kameyama, and Ikuo Fuutagawa, both of Kanagawa, Japan, assignors to Fuji Shashin Film Kabushiki Kaisha, Kanagawa, Japan

Filed July 7, 1967, Ser. No. 651,716
Claims priority, application Japan, July 11, 1966, 41/45260
Int. Cl. G03c *1/84*
U.S. Cl. 96—84 4 Claims

In a photographic material having a backing layer for antihalation, the sticking of the back layer to other emulsion layers can be prevented when the material is rolled and stored at a high temperature and high humidity, by incorporating in the backing layer a surface active agent such as 2-ethylhexyl sodium sulfate, sodium N-stearoyltaurine, sodium stearate, sorbitan monostearate, sorbitan tristearate, polyoxyethylene sorbitan tristearate, polyoxyethylene sorbitan monolaurate and behenic acid amide. The surface active agent has the property of forming aggregates which prevent sticking of the backing layer to other layers with which it comes in contact.

3,617,287

PHOTOPOLYMERIZABLE ELEMENTS CONTAINING A YELLOW DYE

William Jeffers, Fair Haven, N.J., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 30, 1967, Ser. No. 664,280
Int. Cl. G03c *1/68*
U.S. Cl. 96—84 R 7 Claims

An improved photopolymer image reproduction element having in a photopolymerizable layer containing an initiator

that absorbs light in the ultraviolet and visible region of the spectrum a yellow, light-absorbing dye from the group consisting of oxazoline styryl salts, symmetrical thiazoline carbocyanine salts, and pyrazolinone styryl dyes, said dyes absorbing light in the ultraviolet and/or visible regions of the spectrum.

3,617,288

PROPENONE SENSITIZERS FOR THE PHOTOLYSIS OF ORGANIC HALOGEN COMPOUNDS

Richard B. Hartman, White Bear Lake, and George H. Smith, Maplewood, both of Minn., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Sept. 12, 1969, Ser. No. 857,552
Int. Cl. G03c *1/60, 1/72*
U.S. Cl. 96—90 **8 Claims**

Photosensitive compositions containing non-basic propenone compounds as sensitizers for photolyzable organic halogen compounds, and image recording elements in which at least one layer contains such photosensitive compositions.

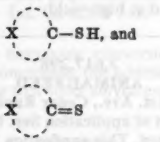
3,617,289

STABILIZATION PROCESS FOR THERMALLY DEVELOPABLE LIGHT-SENSITIVE ELEMENTS

Kinji Ohkubo, and Takao Masuda, both of Kanagawa, Japan, assignors to Fuji Shashin Film Kabushiki Kaisha, Kanagawa, Japan

Filed Dec. 7, 1967, Ser. No. 688,695
Claims priority, application Japan, Dec. 10, 1966, 41/80935
Int. Cl. G03c *1/06*
U.S. Cl. 96—95 **1 Claim**

A stabilized, thermally developed, light-sensitive element having been stabilized after development with a solution containing at least one organic compound of the group represented by the general formulas:



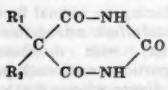
3,617,290

BARBITURIC ACID DERIVATIVES STABILIZERS FOR EMULSIONS SENSITIZED WITH ETHYLENE OXIDE CONDENSATE

Henry Walter Wood, Ilford, England, assignor to Ilford Limited, Ilford, England

Filed Feb. 2, 1968, Ser. No. 702,543
Claims priority, application Great Britain, Feb. 13, 1967, 6,830/67
Int. Cl. G03c *1/02*
U.S. Cl. 96—94 **6 Claims**

This application describes a process for the production of a gelatino silver halide emulsion which comprises forming the emulsion by a technique including a step wherein the emulsion is sulfur sensitized, and adding to the emulsion (1) an ethylene oxide condensate in quantity sufficient to increase the speed of the emulsion and the contrast of images developed therein, and (2) at least 1 g. per gram mole of silver halide present, of a compound of the general formula:



wherein R_1 is an aryl group and R_2 is a lower alkyl group.

3,617,291

TWO-EQUIVALENT COUPLERS FOR PHOTOGRAPHY

George W. Sawdey, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 10, 1967, Ser. No. 674,090
Int. Cl. G03c *1/40*
U.S. Cl. 96—100 **10 Claims**

Two-equivalent development inhibitor releasing couplers derived from four-equivalent couplers by replacing a single hydrogen atom on the carbon atom in the reactive coupling position with a benzotriazolyl radical are valuable couplers for use in photographic materials and processes. The immediate couplers including the 2,6-biscoupler benzo[1,2-d:4,5-d']bistriazoles absorb ultraviolet light, fluoresce and have good stability to exposure to light, heat, humidity and aldehyde hardening agents, and couple actively to produce good dyes having excellent stability to heat and light.

3,617,292

COATING COMPOSITIONS COMPRISING A COLLOID AND A POLYOXYALKYLENE ETHER OF A MONOHYDRIC ALCOHOL CONTAINING MORE THAN TWO ALKYL SIDE CHAINS

George M. Gantz, Upper Saddle River, N.J.; E. Scudder Mackey, Binghamton, N.Y., and Raymond L. Mayhew, Summit, N.J., assignors to GAF Corporation, New York, N.Y.

Filed Mar. 22, 1967, Ser. No. 625,035
Int. Cl. G03c *1/38*
U.S. Cl. 96—114.5 **10 Claims**

A coating composition and a photographic support coated therewith, said coating composition comprising a water-permeable colloid and a coating aid comprising a polyoxyalkylene ether of a primary monohydric saturated aliphatic alcohol containing more than two alkyl side chains, said alcohol having the molecular configuration of an alcohol produced by the oxo process, said ether containing from 2 to 20 oxyalkylene groups per mole.

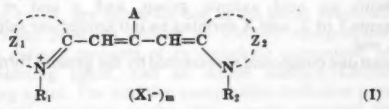
3,617,293

PHOTOGRAPHIC SUPERSENSITIZED SILVER HALIDE EMULSIONS

Keisuke Shiba, and Akira Sato, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

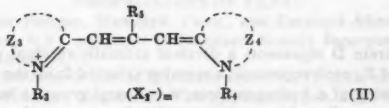
Filed July 26, 1968, Ser. No. 747,879
Claims priority, application Japan, July 26, 1967, 42/48056
Int. Cl. G03c *1/28*
U.S. Cl. 96—124 **6 Claims**

A photographic silver halide emulsion containing at least one carbocyanine dye represented by the following general formula (I):



(I)

and at least one carbocyanine dye represented by the general formula (II):



(II)

The representative moieties set out above are specifically defined in the specification.

3,617,294

SPECTRALLY SENSITIZED SILVER HALIDE PHOTOGRAPHIC EMULSION

Keisuke Shiba; Masanao Hinata, and Akira Sato, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sept. 9, 1969, Ser. No. 856,487
Claims priority, application Japan, Sept. 9, 1968, 43/64854
Int. Cl. G03c *1/28, 1/40*
U.S. Cl. 96—124 **10 Claims**

Photographic silver halide emulsions and color photographic light-sensitive materials containing same, which emulsions comprise at least one benzimidazolocarbocyanine dye combined with at least one pseudocyanine dye containing either a benzothiazole or benzoselenazole nucleus and hydroxy-substituted at the 5-position thereof. The emulsions may optionally contain, in addition a compound containing a benzimidazole nucleus. The emulsions resulting from the above combination of ingredients are green-sensitive emulsions possessing a uniformly high spectrally sensitized sensitivity over a region from 480 to 580 μ and are not affected adversely by the presence of a color coupler in the emulsion. Further, the above combination of additives do not produce color stain upon development.

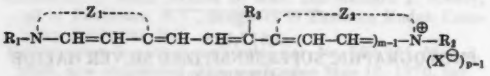
3,617,295

PHOTOGRAPHIC SILVER HALIDE EMULSION

Keisuke Shiba; Masanao Hinata; Hiroshi Misu, and Masao Sawahara, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

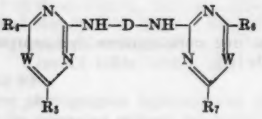
Filed Feb. 23, 1968, Ser. No. 707,478
Claims priority, application Japan, Feb. 23, 1967, 42/11669
Int. Cl. G03c *1/28*
U.S. Cl. 96—126 **8 Claims**

A photographic silver halide emulsion containing at least one sensitizing dye represented by the general formula I



wherein Z_1 represents a nonmetallic atomic group forming a 4-quinoline nucleus, Z_2 represents a nonmetallic atomic group necessary to complete a member selected from the group consisting of a 5-membered heterocyclic ring and a 6-membered heterocyclic ring, R_1 and R_2 each represents a member selected from the group consisting of a nonsubstituted alkyl group and a substituted alkyl group, R_3 represents a member selected from the group consisting of a hydrogen atom and an alkylene group condensed with R_2, X represents an acid anionic group, and p and m each represents 1 or 2, said X forming an intramolecular salt when p is 1, and

at least one compound represented by the general formula II



wherein D represents a divalent aromatic residual group, R_4 and R_6 each represents a member selected from the group consisting of a hydrogen atom, a hydroxyl group, a halogen atom, an alkoxyl group, an aryloxyl group, and arylthio group, R_5 represents a member selected from the group consisting of an aryloxyl group and an arylthio group, and W represents a member selected from the group consisting of CH and N.

3,617,296

OPTICALLY SENSITIZED LIGHT-SENSITIVE SILVER HALIDE MATERIAL

Hans Ohlschlager, Cologne-Stammheim; Oskar Riester, Leverkusen; Helmut Kampfer, Cologne-Stammheim; Karl Lohmer, Leverkusen, and Karl Kuffner, Unterhaching near Munich, all of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed May 8, 1968, Ser. No. 727,696
Claims priority, application Germany, May 22, 1967, A 55 772
Int. Cl. G03c *1/08*
U.S. Cl. 96—140 **7 Claims**

This invention relates to light-sensitive layers, in particular to silver halide emulsion layers, spectrally sensitized with sensitizing dyes which contain a thiocarbamoyl or selenocarbamoyl group.

3,617,297

PROCESS FOR THE PRODUCTION OF DL-METHIONINE COMPOSITION

Yoshitsugu Sawaki; Masao Sada; Bonji Osaki; Zenichi Yamamoto, and Shigeki Nakata, all of, Niihama-shi, Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan

Continuation-in-part of application Ser. No. 658,658, Aug. 7, 1967, now abandoned. This application June 4, 1968, Ser. No. 734,259
Int. Cl. A23k *1/00*
U.S. Cl. 99—2 R **7 Claims**

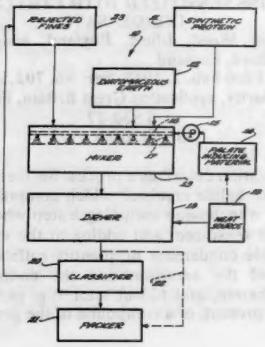
A process for the production of a composition consisting of DL-methionine and calcium salts of phosphoric acid, which comprises forming calcium salt of DL-methionine during synthesis or refining of DL-methionine and reacting said calcium salt of DL-methionine with phosphoric acid, and which not only enables the composition useful for animal feeds to be obtained concurrently with the synthesis of refining of DL-methionine but also enables DL-methionine to be synthesized or refined at high yield.

3,617,298

ANIMAL FEED

Otto A. Kohl, 2222 1st. Ave., Cedar Rapids, Iowa

Continuation-in-part of application Ser. No. 636,661, May 8, 1967, now abandoned. This application May 22, 1969, Ser. No. 826,822
Int. Cl. A23k *1/00, 1/02*
U.S. Cl. 99—2 **12 Claims**



A method of producing an animal feed supplement comprising, mixing moisture-free nitrogeneous source material particles (i.e., urea) with moisture-free fine sized diatomaceous earth particles until each protein material particle is coated with diatomaceous earth particles and then mixing a liquified palate-inducing material (i.e., molasses) with these particles until a three-layered particle is produced and then drying such three-layered particles until they have a

glazed spheroidal surface that is nonhydroscopic and anticaking. The finished product is then either classified with the rejects being recycled and the other portions being packaged or it may be packaged directly. Included are the finished feed supplement particles per se and a method of retarding release of nitrogen in ruminants by feeding them the instant feed supplement.

3,617,299
ANIMAL FEED PREMIX RESISTANT TO STATIC CHARGE AND METHOD OF MAKING SAME

Richard W. Mattoon, Lake Forest, and Lowell R. Macy, Lake Bluff, both of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Filed Aug. 15, 1969, Ser. No. 859,243
Int. Cl. A23k *1/17*
U.S. Cl. 99—2 R **13 Claims**

A nonagglomerating, nonsegregating premix for animal feeds comprising an intimate mixture of an active ingredient and a carrier. The active ingredient has dispersed upon the particles thereof a quantity of a first emulsifier equivalent to 0.1 to 1.0 percent by weight of the active ingredient, the emulsifier having an HLB value of at least 12. The carrier has dispersed upon the particles thereof a quantity of a second emulsifier equivalent to 0.1 to 1.0 percent by weight of the carrier and having an HLB value of 8 or less. The ratio of active ingredient to carrier in the premix can vary from 1 to 9 parts by weight to 4 to 1 parts by weight. Such premixes when blended with feed produce little if any electrostatic charge.

3,617,300
IN SITU CONVERSION OF STARCH

Eugene H. Borochoff, Saint Louis Park; Theodore W. Craig, Minneapolis, and Herbert N. Dunning, Minnetonka, all of Minn., assignors to General Mills, Inc.

Filed Dec. 28, 1967, Ser. No. 694,113
Int. Cl. A23k *1/00*
U.S. Cl. 99—9 **3 Claims**

A process for the enzymatic conversion of starch to glucose in a pet food comprising the addition of alpha-amylase and amyloglucosidase to a solid amylaceous system.

3,617,301
STABILIZATION OF BEER

Donald Barby, Great Barrow, Chester, and James P. Quinn, Warrington, both of England, assignors to Joseph Crosfield and Sons Limited, Warrington, England

Filed Apr. 23, 1968, Ser. No. 723,576
Claims priority, application Great Britain, Apr. 28, 1967, 19783/67
Int. Cl. C12h *1/04*
U.S. Cl. 99—48 **6 Claims**

A process for the treatment of beer to reduce its tendency to form haze on storage and to maintain or improve its head or foam retention characteristics in which the beer is treated with a silica hydrogel having a surface area of at least 700 $m.^2/g.$ and a mean pore diameter from 30–120A.

3,617,302
PREPARATION OF A FLOWABLE PARTICULATE COMPOSITION

Thomas W. Collins, Elgin, Ill., assignor to Kraftco Corporation

Continuation-in-part of application Ser. No. 670,778, Sept. 26, 1967, now abandoned. This application July 8, 1968, Ser. No. 743,044
Int. Cl. A23c *9/00, 1/00*
U.S. Cl. 99—56 **4 Claims**

A process is provided whereby a liquid material may be added to a substantially dry carrier by mechanical mixing, and whereby the resultant mixture remains particulate and flowable. The carrier is treated to provide an expanded, substantially spherical structure capable of holding the desired level of liquid. Any liquid may be used so long as it does not dissolve the solid carrier. The liquid may be normally liquid at room temperature or may be a material that may be liquid at room temperature or may be a material that may be liquefied by mild heating.

3,617,303
PROCESS FOR INCREASING THE AMINO-ACID CONTENT IN CEREALS

Gerardus A. Geurts, Geleen, Netherlands, assignor to Stamicarbon N. V. Heelen, Netherlands

Filed Dec. 6, 1968, Ser. No. 781,988
Claims priority, application Netherlands, Dec. 7, 1967, 6716679
Int. Cl. A23l *1/30*
U.S. Cl. 99—83 **5 Claims**

There is provided an improvement in the process for increasing the amino acid content of cereals by contacting with an aqueous solution of at least one amino acid to cause absorption of the amino acid into the cereal. The improvement resides in first increasing the water content of the cereal prior to contacting the cereal with the solution of at least one amino acid, whereby an increased absorption of the amino acid is obtained.

3,617,304
METHOD FOR MANUFACTURING BISCUITS INTENDED TO BE BROUGHT INTO CONTACT WITH ICE CREAM

Josse Rahm, 454, Ave. Dolez, Uccle, Belgium

Filed Aug. 29, 1968, Ser. No. 756,191
Claims priority, application Luxembourg, Sept. 12, 9167, 54,457
Int. Cl. A21d *2/36, 8/08*
U.S. Cl. 99—86 **6 Claims**

This invention relates to a method for producing baked wafer biscuits, particularly cone-shaped biscuits intended to be used with ice cream. The biscuit is molded in a mold made of two separable pieces from an unleavened paste containing fat in a minimum proportion of about 10 percent of the weight of farinaceous material, a proportion of buckwheat flour lying between 1.8 and 5.5 percent of the weight of farinaceous material, and wherein the two pieces of the mold are separated several times, each time permitting a partial escape of the steam formed during the baking, the biscuit being cooled by a jet of gas before being removed from the mold.

3,617,305
FLOUR-BASED DRY MIXES FOR HOME BAKING

Jacques R. Rolland, Longueil, Quebec, and John Holme, Preville, Quebec, both of Canada, assignors to The Ogilve Flour Mills Company, Limited, Montreal, Quebec, Canada

Filed Nov. 26, 1969, Ser. No. 880,123
Claims priority, application Canada, Nov. 28, 1968, 036423
Int. Cl. A21d *2/28, 2/22, 2/04*
U.S. Cl. 99—91 **13 Claims**

Flour-based, dry mixes for use in the home preparation of yeast-raised products include an additive composition containing defined amounts of an ascorbate compound, an edible oxidizing agent, and an edible sulfhydryl-containing reducing agent. The additive composition inclusion permits a substantial reduction in the time usually required for the kneading and fermentation steps, and, in certain instances, either one of these two steps may be eliminated. The flour-based, dry mixes facilitate the home preparation of yeast-raised products within much shorter periods of time and more conveniently than hitherto.

3,617,306
PROPAGATION OF YEAST

Seymour Pomper, Stamford, Conn., and Emanuel Akerman, Bronx, N.Y., assignors to Standard Brands Incorporated, New York, N.Y.

Continuation-in-part of application Ser. No. 579,218, Sept. 14, 1966, now abandoned. This application Jan. 20, 1970, Ser. No. 4,419
Int. Cl. A23j *1/18*
U.S. Cl. 99—96 **8 Claims**

Yeast is propagated in the presence of an effective amount of a nonnutritive ionizable salt sufficient to impart to the yeast superior leavening activity in sweet dough. Examples of

nonnutritive salts are NaCl, Na_2So_4, NaBr, Na_2Co_3, Na acetate, and $SrC1_2$.

3,617,307
METHOD OF MANUFACTURING IMPROVED MEAT PRODUCTS OF THE SAUSAGE TYPE AND COMPOSITION THEREFOR

Petrus Adam Inklaar, Diepenveen, Netherlands, assignor to Vasco Industries, New York, N.Y.

Continuation of application Ser. No. 527,063, Feb. 14, 1966, now Patent No. 3,552,978. This application Apr. 10, 1968, Ser. No. 720,374
Int. Cl. A22c *11/00*
U.S. Cl. 99—109 12 Claims

Ground meat products (sausages, etc.) are given added protein contents yet deleterious jelly (aqueous) and fat deposits are avoided by incorporating into the meat composition finely divided water soluble protein, e.g., soy bean, milk or egg protein, alpha-amino acid of stated nature and acid-buffering power, e.g., a mixture of sodium glycinate and glycine or lysine-HCl, histidine or methiomine or a slat thereof, or other such acid. The additions are made during cuttering. They may be in a finely divided preparation of the protein with 1 to 10 percent of its weight of the amino acid.

3,617,308
MARGARINE FAT AND PROCESS FOR PREPARING A SPREAD

Hendrik Albertus Graffelman, Papendrecht, Netherlands, assignor to Lever Brothers Company, New York, N.Y.

Filed June 27, 1967, Ser. No. 649,099
Claims priority, application Great Britain, June 28, 1966, 28,917/66
Int. Cl. A23d *3/10*
U.S. Cl. 99—118 4 Claims

This invention provides edible fat products, especially margarines and spreads comprising a blend of a hard fat with a higher proportion of liquid vegetable oil, wherein the hard fat amounts to 8 to 15 percent, preferably 8 to 12 percent, by weight of the total composition and is composed of the random interesterification product of a mixture of hardened vegetable oil with a slip melting point not less than 50° C. and free from significant proportions of combined fatty acid having less than 16 carbon atoms, with fully hardened palm kernel oil in the ratio of 25–75:75–25, preferably about 40:60, parts by weight, and the liquid vegetable oil is one containing at least 40 percent of linoleic acid and in which the proportion of saturated to unsaturated acids is not greater than 1:2. The invention also includes processes for preparing such products.

3,617,309
PUFFED FOOD PRODUCT AND METHOD OF PRODUCING

Arnold Rebane, Villa Park, Ill., assignor to The Wander Company, Lincoln, Nebr.

Filed May 7, 1969, Ser. No. 822,718
Int. Cl. A23g *3/00*; A23b *7/16*
U.S. Cl. 99—138 R 8 Claims

A puffed food product, such as popcorn, having a thin protective outer glaze coating which encloses the puffed food product and protects the product against atmospheric moisture while preventing the loss of flavor from the product. One embodiment comprises an improved acid-fruit-flavored popcorn product which is prepared by applying a water-free oil base flavor solution to the popcorn, distributing a layer of powdered edible organic acid, such as citric, malic, tartaric, adipic, or succinic acid over the oil-base flavor coating, and applying a thin syrup glaze coating over the layer of organic acid to protect the popcorn against loss of crispness and flavor.

3,617,310
ALKYLTHIAZOLIDINES AS CHOCOLATELIKE FLAVORS

George P. Rizzi, Springfield Township, Hamilton County, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

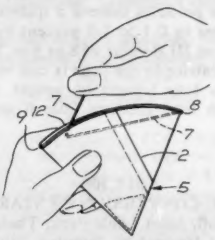
Filed June 25, 1969, Ser. No. 836,607
Int. Cl. A23l *1/22*
U.S. Cl. 99—140 R 7 Claims

Novel alkylthiazolidines are useful as chocolatelike or cocoalike flavors. Examples of the novel compounds are 2-isopropylthiazolidine and 2-isobutylthiazolidine.

3,617,311
SEALED BEVERAGE DRINKING CUP

Robert Beltle, Waiblingen; Hans Paal, Grossheppach, and Wolfgang Schiller, Gartenberg, all of Germany, assignors to Frigeo-Werk Bettle & Co., Geradstetten, Germany

Filed Nov. 6, 1968, Ser. No. 773,846
Claims priority, application Germany, Nov. 18, 1967, P 15 86 641.8
Int. Cl. B65d *5/02*, *31/18*
U.S. Cl. 99—171 M 6 Claims



A sealed drinking cup containing a small quantity of a dry pulverized or granulated substance which, after the cup is opened, may be dissolved by the addition of a liquid to form a beverage which may be drunk from this cup. The cup is first folded from its original open condition into the shape of a flat bag into which the substance is filled and which, when the cup is to be used, may be easily unfolded to its original shape after its sealing element in the form of a string or tape which is coated with a thermoplastic adhesive is pulled out of the bag.

3,617,312
ANTIMYCOTIC OVERCOATING TREATMENT OF CELLULOSE SAUSAGE CASING

Henry J. Rose, Danville, Ill., assignor to Tee-Pak, Inc., Chicago, Ill.

Filed July 18, 1968, Ser. No. 745,670
Int. Cl. A22c *13/00*
U.S. Cl. 99—176 2 Claims

Cellulose sausage casings are protected against fungus growth by overcoating with a partially water-swellable, water-insoluble, water- and gas-permeable coating composition containing an antimycotic agent which will leach slowly from the coating under conditions of use. Preferred coating compositions comprise a long-chain polyester and a polyacrylic acid emulsion, and an antimycotic agent such as potassium, sodium, or calcium sorbate or propionate, or sorbic or propionic acid, or the lower alkyl esters of parahydroxybenzoic acid, and form a water-insoluble, partially water-swellable, water- and gas-permeable coating upon curing.

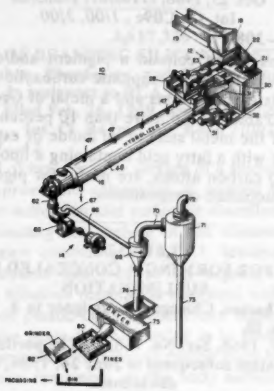
3,617,313
HYDROLYZING APPARATUS

Bert S. Harrington, Jr., Chamblee, Ga., and Joseph Vojacek, Jr., Brookfield, Ill., assignors to Chemetron Corporation, Chicago, Ill.

Filed Dec. 8, 1967, Ser. No. 689,186
Int. Cl. A23k *1/10*
U.S. Cl. 99—235 R 12 Claims

There is provided a method and apparatus for the continuous process hydrolyzing under pressure of fibrous material such as the byproducts of poultry—feathers, blood, offal,

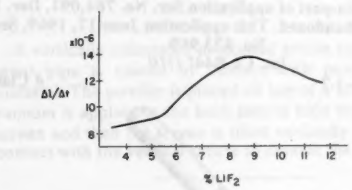
hair, and the like. The hydrolyzing takes place within a pressure vessel and inlet means are provided for continuously introducing the untreated material into the vessel while the vessel is maintained under pressure. This is accomplished by compressing the untreated material into a substantially pressure-impervious plug which moves through the inlet passageway continuously into the pressure vessel. Discharge means are also provided for releasing the treated material continuously from the pressure vessel while the pressure vessel is maintained under pressure.



3,617,314
WOOD TREATMENT
Robert E. Hill, Clayton, Mo., assignor to Monsanto Company, St. Louis, Mo.
Filed July 23, 1968, Ser. No. 746,738
Int. Cl. C09k *3/18*
U.S. Cl. 106—2 **14 Claims**

A wood treatment composition which imparts water repellency to kiln-dried lumber.

3,617,315
CASTABLE REFRACTORY DIE AND MODEL COMPOSITIONS
Ronald C. Vickery, Northport, N.Y., assignor to Ceramco Equipment Corporation, Long Island City, N.Y.
Continuation-in-part of application Ser. No. 583,087, Sept. 29, 1966, now abandoned. This application Nov. 24, 1969, Ser. No. 879,345
Int. Cl. B28b *7/28, 7/36*
U.S. Cl. 106—38.3 **9 Claims**



A dimensionally accurate, thermally stable, castable refractory composition having a controllable coefficient of thermal expansion, setting expansion and firing shrinkage which consists essentially of an admixture of magnesium oxide, calcium aluminate, ammonium dihydrogen phosphate, an alkali metal or alkaline earth fluoride compound and a colloidal silica solution. The refractory composition may be adjusted in its thermal expansion properties by variation in the fluoride content of the composition. The adjustment in coefficient of thermal expansion would coincide with that coefficient of porcelain employed in the coating of dental prosthetic restorations. The invention also includes a separating coating composition for the cast-fired composition above mentioned, which enables it to maintain separation between the refractory cast composition and an applied porcelain slurry which is spread over the cast and separating medium to construct the dental prosthesis. The separating coating is made up of a composition of potassium fluoride, stearic acid and a volatile organic solvent such as carbon tetrachloride.

3,617,316
PHOTOTROPIC GLASS
Joji Suzuki, Itami, and Makoto Kume, Takarazuka, both of Japan, assignors to Nippon Sheet Glass Co., Ltd., Osaka, Japan
Continuation-in-part of application Ser. No. 606,530, Jan. 3, 1967, now Patent No. 3,548,060. This application July 31, 1970, Ser. No. 60,105
Int. Cl. C03c *3/26, 3/14*
U.S. Cl. 106—47 **2 Claims**

A phototropic glass comprising a borate glass body containing therein mycrocrystals of silver chloride or silver bromide, and copper oxide, and method of producing the phototropic glass which comprises melting a bath for the said glass body, forming and cooling the molten glass, heat treating said glass to cause the silver halide to crystallize, and cooling the glass.

3,617,317
GLASS BATCHES FOR THE PRODUCTION OF TRANSPARENT GLASS CERAMICS CONTAINING SOLID SOLUTIONS OF β-EUCRYPTITE
Werner Sack, Mainz-Gonsenheim, and Herwig Scheidler, Mainz-Mombach, both of Germany, assignors to Jenaer Glaswerk Schott & Gen., Mainz, Germany
Filed June 26, 1968, Ser. No. 740,317
Claims priority, application Germany, June 29, 1967, P 15 96 858.8
Int. Cl. C03c *3/22*
U.S. Cl. 106—52 **5 Claims**

Glass having the following composition:

SiO_2	67.7–69.6
Al_2O_3	18.7–19.2
Li_2O	2.8–2.9
Na_2O	0.7
CaO	0.8–2.2
MgO	0.0–2.5
ZnO	0.0–5.2
TiO_2	1.5
ZrO_2	1.8
Sb_2O_3	1.0

the sum of CaO+MgO+ZnO being 3.3–5.8 percent by weight and the weight ratio of MgO+ZnO/CaO being between 1.4 and 6.6. Heattreating of objects formed of such glass at about 650° to 850° C. whereby to form transparent glass ceramics containing solid solutions of β-eucryptite having a coefficient of thermal expansion of about −7 to +14 $\times 10^{-7}$ C. within the temperature range of about 20° to 300° C.

3,617,318
MAGNESIA-CONTAINING REFRACTORY PRODUCTS AND METHODS OF MAKING SAME
Leonard John Minnick, Cheltenham, Pa., assignor to G. & W. H. Corson, Inc., Plymouth Meeting, Pa.
Filed Jan. 10, 1969, Ser. No. 790,425
Int. Cl. C04b *35/06*
U.S. Cl. 106—58 **20 Claims**

A refractory batch mix in which the refractory grain consists essentially of an intimate mixture of (1) selectively calcined dolomite in which the calcium exists substantially as calcium carbonate and the magnesium exists substantially as magnesium oxide, and (2) at least one magnesia-containing grain selected from the group consisting of periclase and dead-burned dolomite.

3,617,319
HIGHLY REFRACTORY ALUMINOUS CEMENT AND PROCESS FOR ITS MANUFACTURE

Gerard Henri Sadran, Paris, and Louise Marie Assaud, Montelimar, both of France, assignors to Societe Anonyme: Ciments Lafarge, Paris, France

Filed July 24, 1968, Ser. No. 747,099
Claims priority, application France, July 31, 1967, 116,376
Int. Cl. C04b 7/32
U.S. Cl. 106—104 2 Claims

A highly refractory aluminous cement which comprises about 60% clinker, about 40% Al_2O_3, about 2% $AlNa_3F_6$ and about 0.18% to 2.5% sodium citrate and has a grain size distribution in which about 90% of the particles are under 30 microns. The clinker is formed by burning Al_2O_3 (98% purity) and $CaCO_3$ (99% purity). It contains a mixture of $CaO \cdot Al_2O_3$ and $CaO \cdot 2Al_2O_3$ in the ratio of approximately 1:1. The clinker is crushed, and the required amounts of Al_2O_3, $AlNa_3F_6$ and sodium citrate are added. Final crushing reduces the size of the desired dimensions.

3,617,320
METALLIZING SUBSTRATES

Sung Ki Lee, Niagara, N.Y., assignor to Hooker Chemical Corporation, Niagara Falls, N.Y.

Filed Aug. 6, 1968, Ser. No. 750,487
Int. Cl. C08b 21/04
U.S. Cl. 106—162 10 Claims

There is provided a two-phase bath for metallizing substrates which comprises a first phase comprising phosphorus in a solvent, and multipurpose agent, and a second phase comprising a metal salt or complex thereof and multipurpose agent, wherein said multipurpose agent is selected from the group consisting of cellulose derivatives, vinyl polymers and copolymers, acrylic polymers, novolacs, oxyalkylated novolacs, oxyalkylated aniline novolacs, oxyalkylated polyols, glycols, polyglycols, siloxanes, natural rosins and gums, and mixtures thereof. The multipurpose agent serves as viscosity modifier, surface and interfacial tension controller, film former and surfactant.

3,617,321
SPRAY-ON COATING COMPOSITION

Raymond C. Kent, Lancaster, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.

Filed Aug. 28, 1969, Ser. No. 853,962
Int. Cl. C08b 27/10
U.S. Cl. 106—186 3 Claims

Spray-on coating composition adapted for forming monolithic white ceiling structures having, on a dry weight basis, 5 to 35 percent by weight expanded perlite; 10 to 40 percent by weight fibrous talc; 15 to 80 percent by weight inorganic filler; 1 to 4 percent by weight organic binder; 0 to 1 percent by weight cross-linking agent and 1 to 5 percent by weight fine fibrous asbestos. The dry ingredients are mixed with sufficient water to provide a spray-on coating composition having a viscosity in the range of from 10 to 30 poises at a shear rate of 60 seconds $^{-1}$.

3,617,322
DEXTRIN ADHESIVE INCORPORATING PICRIC ACID FOR DECREASING VISCOSITY AND IMPROVING SEALABILITY

Finn Clement, deceased, late of Cincinnati, Ohio (by Gordon E. Iliff, administrator), assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Feb. 24, 1970, Ser. No. 13,778
Int. Cl. C08b 25/02
U.S. Cl. 106—213 6 Claims

Improved dextrin adhesive composition for carton sealing adhesives incorporating picric acid in small amounts, the advantages of which are, inter alia, a decrease in the viscosity for a given solids content of the adhesive, and an improvement in the initial tack and the sealability.

3,617,323
PIGMENT PREPARATIONS

Albert Riegler, Basel, Switzerland, assignor to Ciba Limited, Basel, Switzerland

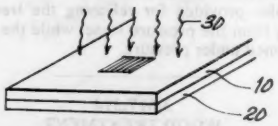
Filed Nov. 19, 1968, Ser. No. 777,147
Claims priority, application Switzerland, Dec. 5, 1967; Oct. 25, 1968, 17104/67; 14835/68
Int. Cl. C09c , 1/00, 3/00
U.S. Cl. 106—308 F 7 Claims

Preparations which contain a pigment and/or an optical brightener and a salt of an aliphatic carboxylic acid containing at least six carbon atoms and a metal of Group 2 or 3 of the Periodic Table and no more than 10 percent (referred to the weight of the metal salt) of an amide or ester of a lower alkanolamine with a fatty acid containing a lipophilic residue of at least 10 carbon atoms, are useful for pigmenting high-melting thermoplastic compositions.

3,617,324
METHOD FOR FORMING A CONCEALED IMAGE BY SUBLIMINATION

Richard E. Thomas, Chicago, Ill., assignor to A. B. Dick Company, Niles, Ill.

Filed Oct. 17, 1968, Ser. No. 768,372The portion of the term of the patent subsequent to June 24, 1986, has been disclaimed.
Int. Cl. B41m 5/12
U.S. Cl. 117—1.7 4 Claims

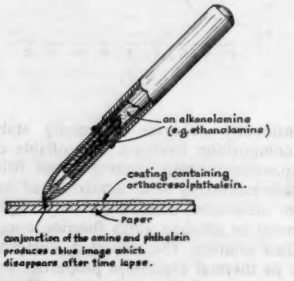


A teaching process which makes use of a copy sheet having a visible image, a master sheet having a visible image keyed to the visible image on the copy sheet and a coating associated with the imaged master containing an invisible heat volatilizable material capable of reaction with a developer component for development of color which includes positioning the copy sheet with its printed side in surface contact with the coating and radiating the master sheet to develop a corresponding heat pattern to cause volatilization of the material in the corresponding areas of the coating for transfer to provide a latent image on the corresponding areas of the copy sheet, and in which the latent image is developed by wetting with the development material.

3,617,325
WRITING

Raymond E. Spokes; John William Edwards, Jr., and Daniel Ward Edwards, all of Ann Arbor, Mich., assignors to Chem-Rite Associates, Ann Arbor, Mich.

Continuation-in-part of application Ser. No. 784,091, Dec. 16, 1968, now abandoned. This application June 17, 1969, Ser. No. 833,959
Int. Cl. B44f 1/10
U.S. Cl. 117—1.7 4 Claims



Impermanent marks, they may disappear in a day or less, are created by "writing," with a stylus presenting an al-

kanolamine, on a sheet of paper coated with a material which changes to a distinctive color upon exposure to the amine. The marks disappear in a short period of time so that exercise books used at the elementary school level can be reused in the following semester or term without additional cost as would be entailed in the purchase of new books.

3,617,326

METHOD OF BRANDING SILICON PLASTIC SURFACE

John R. Zuber, Piscataway, and Herbert Foxman, Raritan, both of N.J., assignors to RCA Corporation

Filed Feb. 26, 1969, Ser. No. 802,675
Int. Cl. B41m *1/30*; B44d *1/092*
U.S. Cl. 117—12 3 Claims

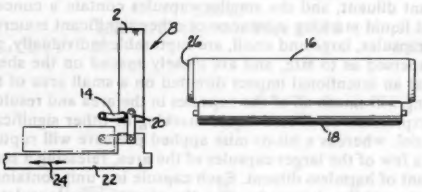
A method of branding the surface of a silicone plastic body so as to improve the adherence of printed trademark and type number indicia on said surface is described. The method comprises treating the surface of the silicone plastic body with a solution consisting of 1,1,3,3, tetramethylguanidine and a surfactant dissolved in an organic solvent. Conveniently, a bibulous material is saturated with the solution, and a silicone plastic body is positioned thereon so that the surface of the body to be branded is in contact therewith. After a few minutes, the silicone plastic body is removed, any excess solution remaining on the body surface is wiped off, and the desired indicia are then printed on the treated surface.

3,617,327

METHOD AND APPARATUS FOR APPLYING A COATING MATERIAL

Leonard Irving Daniel, Flagtown, N.J., assignor to Johns-Manville Corporation, New York, N.Y.

Filed Dec. 29, 1966, Ser. No. 605,892
Int. Cl. B44d *1/094*
U.S. Cl. 117—18 5 Claims



A vertically orientated preheated article such as a fibrocement pipe is coated by contact with powdered resinous material. The powder is placed on top of a horizontal screen, vacuum is applied to the back side to hold the powder to the screen and then the screen is tilted vertically and moved into contact with the vertical article to deposit the coating.

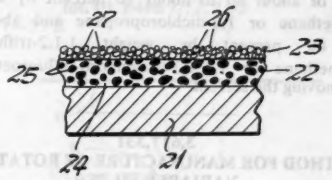
3,617,328

TRANSFER ELEMENTS AND METHOD OF MAKING SAME

Douglas A. Newman, Glen Cove, N.Y., assignor to Columbia Ribbon and Carbon Manufacturing Co., Inc., Glen Cove, N.Y.

Filed Sept. 25, 1967, Ser. No. 670,283
Int. Cl. B41m *5/10*
U.S. Cl. 117—21 10 Claims

Pressure-sensitive transfer elements of the squeezeout type which are rendered cleaner to the touch and resistant to producing typewriter roller marks on the copy sheet by covering the ink-releasing surface of such transfer elements with a very thin porous layer of thermoplastic resin particles



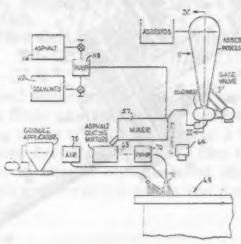
which are fused to each other and to the ink layer to provide an ink-permeable protective layer over the ink layer.

3,617,329

METHOD FOR SPRAY-COATING A ROOF WITH A COMPOSITION CONTAINING LIQUID ASPHALT AND FLUFFED ASBESTOS FIBER

Myron F. Goff, 6404 Thelma Rte. 4, Paw Paw, Mich.

Filed July 3, 1967, Ser. No. 650,794
Int. Cl. B44d *1/08*, *1/14*
U.S. Cl. 117—27 10 Claims



A method of covering a surface such as a roof of a building with a coating including a liquid asphalt, diluents for controlling the hardening of the asphalt and granules which are applied to the asphalt while it is in the liquid state. The method is carried out by means of apparatus including a machine for fluffing fibrous material, a machine for mixing the fibrous material with the liquid asphalt and the diluents, and mechanism for moving the asphalt mixture to the surface and applying same evenly thereon. The apparatus also includes a device for moving the granules from a supply thereof to a point near the surface and then spreading said granules evenly over a coating of the liquid asphalt applied to the surface.

3,617,330

MOULDINGS OF POLYCARBONATES WITH IMPROVED SURFACES AND PROCESS FOR THEIR PRODUCTION

Gunter Peilstocker, Krefeld-Bockum, Germany, assignor to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation-in-part of application Ser. No. 711,175, Mar. 7, 1968, now abandoned. This application Sept. 3, 1969, Ser. No. 855,015
Claims priority, application Germany, Mar. 9, 1967; Oct. 1, 1968 P15 97 137.0; P18 00 277.2
Int. Cl. C08g *51/58*, *51/60*
U.S. Cl. 117—33.3 4 Claims

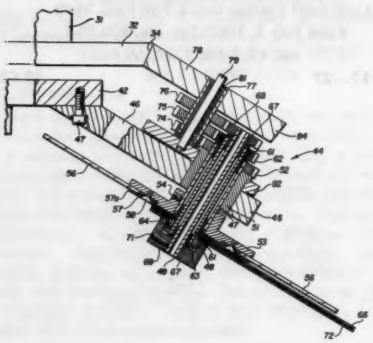
Shaped articles of high molecular weight thermoplastic polycarbonates having improved ultraviolet resistance have an ultraviolet absorber in an amount of from about 3 to about 30 grams per square meter dispersed to a depth of 5 to about 30μ from the surface, which is sealed, may be prepared, for example, by applying to the surface about 150 to about 300 cc./sq./m. of a solution containing from about

2.5 to about 10 percent by weight of an ultraviolet absorber in a mixture of one part by weight of 1,2-dichloropropane and about 1 to about 25 parts by weight of benzene or in a mixture of about 80 to about 20 percent by weight 1,2-dichloroethane or 1,2-dichloropropane and about 20 to about 80 percent by weight 1,1,2-trifluoro-1,2,2-trichloroethane or 1,1,2,2-tetrachloro-difluoroethane and then removing the solvent.

3,617,331
METHOD FOR MANUFACTURE OF ROTATABLE VARIABLE FILTER

Rolf F. Illsley; Alfred J. Thelen, and Joseph H. Apfel, all of Santa Rosa, Calif., assignors to Optical Coating Laboratory, Inc., Santa Rosa, Calif.

Division of Ser. No. 391,928, Aug. 25, 1964, Pat. No. 3,442,572. Filed Nov. 12, 1968, Ser. No. 774,610
Int. Cl. C03c *17/00*
U.S. Cl. 117—33.3 3 Claims



Method for manufacture of a rotatable variable filter by controlling the deposition of a coating material on a substrate by the use of first and second masks in which the first and second masks and the substrate form three elements and in which at least two of the elements are rotated with respect to each other and the third element to cause the material to be deposited upon the substrate so that the optical thickness of the coating material varies with angle through a predetermined angle on the substrate.

3,617,332
METHOD FOR STABILIZING ALKALINE-EARTH METAL SULFIDE PHOSPHORS

Willi Lehmann, Murrysville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 24, 1969, Ser. No. 835,952
Int. Cl. H01j *33/20*
U.S. Cl. 117—33.5 C 10 Claims

Method for stabilizing finely divided phosphors which have an alkaline-earth metal sulfide matrix wherein the phosphor is exposed to a solution of fluoride compound which reacts with the surface portion of the phosphor. Thereafter, the residual solution is separated from the phosphor. The resulting stabilized phosphor has particular utility for cathodoluminescent application such as cathode-ray tubes, and it can also be used in photoluminescent applications, such as lamps.

3,617,333
PROCESS FOR FLOTATION TREATMENT OF GLASS BEADS

Pervis Brown, St. Louis, Mo., assignor to General Steel Industries, Inc., St. Louis, Mo.

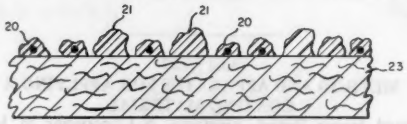
Filed Oct. 30, 1968, Ser. No. 771,978
Int. Cl. C03c *17/28, 17/22*
U.S. Cl. 117—35 R 10 Claims

A process for surface treating or sizing glass beads and similar discrete particles such as silicon carbide, sand and the like, with a chemical adhesion promoter to provide the glass beads with water repellent and organic solvent repellent properties. The surface treatment improves adhesion of the bead to the substrate in which it is embedded, which may be paint or various types of organic binders. Because of the hydrophobic and oleophobic properties provided through repellent surface treatment, the beads do not sink through the binder but rather are floated thereon, and the top surfaces are exposed to provide for reflex-reflective properties. The surface treating or sizing agent is an organo-titanium derivative, including alkyl-titanates, titanium-acylates, and titanium-chelates, in which between two and four of the coordination positions of the titanium are occupied by alkyl or aromatic groups.

3,617,334
PRESSURE-SENSITIVE SHEET MATERIAL

Bruce W. Brockett, Dayton; John W. Stutz, Dayton, and Frederick D. Weaver, Trotwood, all of Ohio, assignors to The National Cash Register Company, Dayton, Ohio

Filed Nov. 8, 1968, Ser. No. 774,260
Int. Cl. B41m *5/10, 5/22*
U.S. Cl. 117—36.1 9 Claims



This invention relates to paper, or like sheet material, sensitized with a coating of liquid-containing pressure-rupturable capsules of both minute and a little larger dimensions arranged in interspersion and in close juxtaposition. In the preferred embodiment, the larger capsules contain a nonsignificant diluent, and the smaller capsules contain a concentrated liquid marking substance or other significant material. The capsules, large and small, are rupturable individually, are interspersed as to size, and are closely spaced on the sheet, so that an intentional impact directed on a small area of the coating will smash all of the capsules in the area and result in the expression of diluted liquid marking or other significant material, whereas a hit-or-miss applied pressure will rupture only a few of the larger capsules of the area, releasing a small amount of harmless diluent. Each capsule is a unit containing a cluster of droplets and, when the cluster is encapsulated, forms an irregular botryoid minute mass. The larger and protruding bosses of the diluent capsules represent outside droplets acting to guard the smaller capsule units beside them. The marking or other significant material may be an inherently colored dye, a colorless chromogenic color reactant, or an odorous, obscurant, or active material, and the capsules on a sheet may be associated with other materials on the sheet or be used to express their contents onto another sheet in contact therewith.

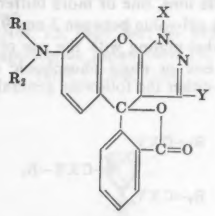
3,617,335
PRESSURE-SENSITIVE COPYING PAPER

Shiro Kimura; Teruo Kobayashi, and Sadao Ishige, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed July 15, 1969, Ser. No. 842,008
Claims priority, application Japan, July 15, 1968, 43/49817
Int. Cl. B41m *5/22*
U.S. Cl. 117—36.2 5 Claims

A pressure-sensitive copying paper comprising a support having coated thereon microcapsules containing an organic solvent solution of a compound which, when in contact with

an electron acceptable solid acid, forms a color dye and is represented by the following formula:

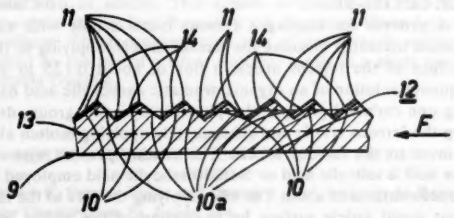


wherein R_1 and R_2 each represents a member selected from the group consisting of an alkyl group having from one to five carbon atoms and a benzyl group; X represents a member selected from the group consisting of an alkyl group having from one to five carbon atoms and an aryl group, and Y represents a member selected from the group consisting of an alkyl group having from one to 17 carbon atoms, an aryl group, an amino group, an acylamino group and an alkoxy group having from one to five carbon atoms.

ERRATUM

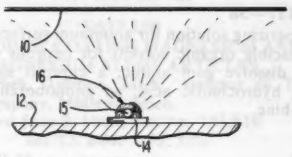
For Class 117—36.2 see:
Patent No. 3,617,410

3,617,336
DECORATIVE SURFACE RELIEF PATTERN
Pierre Gilard, Mont sur Marchienne, and Maurice Galanti, Ransart, both of Belgium, assignors to Institut National Du Verre A.S.B.L., Charleroi, Belgium
Filed June 3, 1968, Ser. No. 733,929
Claims priority, application Luxembourg, June 28, 1967, 53973
Int. Cl. B44d *1/10;* **C03c** *17/10*
U.S. Cl. 117—37 **8 Claims**



A surface relief pattern to produce a decorative effect on an article wherein the surface is provided with a plurality of tapered protrusions with the protrusions having sloping surfaces. Corresponding sloping surfaces or portions thereof are provided with surface coatings which may be of different colors, different materials, different thicknesses or uncoated so as to produce dissimilar appearances between the sloping surfaces or portions thereof. In the method of forming this decorative effect the surface with the protrusions is passed through a free-falling film of surface coloring material so that heavier coatings of the material are formed on the sloping surfaces facing the direction of movement of the surface.

3,617,337
METHOD OF FORMING A DECORATIVE ARTICLE
Robert W. Presley, R.F.D. 1, Makanda, Ill.
Filed Mar. 11, 1969, Ser. No. 806,127
Int. Cl. B44d *1/12, 1/02*
U.S. Cl. 117—37 R **3 Claims**

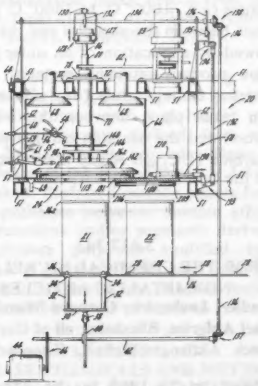


A method of making a decorative article which includes subjecting a flowable coating material to the force of an explosion (e.g., firecracker), which force projects the coating material onto a substrate in a random decorative pattern.

3,617,338
METHOD FOR PRODUCING A LATENT STRIATED EFFECT ON PLASTIC FILMS
Robert J. Caiola, Fort Wayne, Ind., and Carl E. Dewald, Findlay, Ohio, assignors to The Dow Chemical Company, Midland, Mich.
Filed Oct. 20, 1969, Ser. No. 867,809
Int. Cl. B05c *1/16;* **B29c** *25/00*
U.S. Cl. 117—37 R **9 Claims**

A process and apparatus for the rapid vapor phase sulfonation of plastic films wherein the film is treated with a jet of a gas containing sulfur trioxide to achieve a latent striated effect. Subsequent dyeing of the treated film with water soluble dyes produces an attractively decorated, distinctive film useful as a wrapping material for edible and nonedible consumer goods.

3,617,339
SPRAY COATING METHODS
Johannes Kiwiet, Riverside, Ill., assignor to Inland Steel Company, Chicago, Ill.
Division of Ser. No. 587,333, Oct. 17, 1966, Pat. No. 3,532,072.
Filed Sept. 18, 1969, Ser. No. 869,435
Int. Cl. B44d *1/52;* **B05b** *13/02*
U.S. Cl. 117—38 **3 Claims**



A method of externally coating select portions of a cylindrical surface with spray material wherein the surface is positioned adjacent to the spray nozzle and at least one mask which is shifted in close proximity to the surface in the vicinity of the nozzle and the surface and mask are rotated while material is applied from the nozzle.

3,617,340

METHOD AND COMPOSITION FOR COPPERIZING ALUMINUM OFFSET PLATES COATED WITH AN EXPOSED AND DEVELOPED WATER-SOLUBLE RESIST

Lawrence E. Thielen, Villa Park, Ill., assignor to R. R. Donnelley & Sons Company

Filed Oct. 22, 1968, Ser. No. 769,753
Int. Cl. C23c *3/00*
U.S. Cl. 117—38 4 Claims

A copperizing solution for aluminum surfaces comprising a water miscible organic solvent for cuprous chloride which will not dissolve gum arabic; a cuprous salt such as the chloride; hydrochloric acid; an aminoborane; and a trialkylphosphine.

3,617,341

METHOD OF DEPOSITING IN SITU A CERAMIC OR GLASS FILM ON THE SURFACES OF A SUBSTRATE

Gerald B. Fefferman, Parsippany, N.J., assignor to Bell Telephone Laboratories Incorporated, Murray Hill, N.J.

Filed Sept. 30, 1969, Ser. No. 862,480
Int. Cl. B44d *1/46;* C03c *5/00*
U.S. Cl. 117—46 CA 4 Claims

An inorganic film in either the crystalline or vitreous state is formed in situ on a suitable substrate by the decomposition of metal and/or metalloidal resinates. A plurality of metallic and/or metalloidal resinates, which form inorganic oxides upon decomposition in air or an oxidizing atmosphere, are physically admixed to form a resinate mixture. The resinate mixture is applied to the substrate and the substrate is fired in air to a temperature sufficient to (1) decompose the resinate mixture to form the inorganic oxides and (2) combine the resultant inorganic oxides to form a film either in the crystalline or amorphous state on the surfaces of the substrate.

3,617,342

NUCLEAR REACTOR FUEL ELEMENTS

John Vincent Shennan, Preston, and Lionel Houston Ford, St. Annes-on-Sea, both of England, assignors to United Kingdom Atomic Energy Authority, London, England

Filed Mar. 15, 1968, Ser. No. 713,287
Claims priority, application Great Britain, Mar. 22, 1967, 13,593/67
Int. Cl. G21c *21/00*
U.S. Cl. 117—46 5 Claims

A method of producing coated particles of uranium dicarbide wherein a layer of pyrolytic carbon is deposited on uranium carbide particles of composition from $UC_{1.0}$ to $UC_{1.6}$ at a temperature (e.g., 1000° C. to 1400° C.) such that little reaction occurs between the particles and the applied carbon coating followed by application of an outer coating of high density fission product retaining material on the carbon coated particles at a temperature (e.g., above 1450° C.) such that reaction takes place between the initial coating of pyrolytic carbon and the uranium carbide particles to form uranium dicarbide ($UC_{1.85}$). A gap is produced between the particles and the coating on the particles.

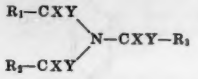
3,617,343

PROCESS FOR THE CHEMICAL NICKEL-PLATING OF NONMETALLIC ARTICLES

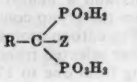
Joachim Kandler, Lechenich; Gerhard Mietens, Walberberg, and Michael Ahlgrim, Bliesheim, all of Germany, assignors to Knapsack Aktiengesellschaft, Knapsack bei Cologne, Germany

Filed Oct. 29, 1968, Ser. No. 771,643
Claims priority, application Germany, Dec. 9, 1967, P 16 21 275.2 P 16 21 276.3; Jan. 17, 1968, P 16 96 113.0
Int. Cl. B44d *1/092;* C23c *3/02*
U.S. Cl. 117—47 R 2 Claims

Chemical nickel-plating of nonmetallic articles, which are (a) cleaned by mechanical and/or chemical treatment, (b) activated later by means of an aqueous palladium slat solution, of which the palladium salt is reduced to palladium, and (c) immersed in a nickel-plating bath, which is preheated to a temperature between about 30° and 70° C., contains nickel and hypophosphite ions, one or more buffer substances, and is maintained at a pH-value between 3 and 9, comprising carrying out the nickel-plating with the use of a nickel-plating bath containing one or more phosphonic acid compounds corresponding to either the following general formula



or the general formula



3,617,344

NONTHROMBOGENIC PLASTIC SURFACES AND PREPARATION THEREOF

Robert I. Leininger, and Richard D. Falb, both of Columbus, Ohio, assignors to The United States of America as represented by the Secretary of the Department of Health Education and Welfare

Filed Aug. 5, 1966, Ser. No. 570,411
Int. Cl. A61k *17/18;* B44d *5/12*
U.S. Cl. 117—47 16 Claims

A plastic polymer surface rendered substantially nonthrombogenic by heparin chemically combined with quaternary ammonium groups which are chemically bonded to the plastic polymer surface, which is preferably flexible or elastomeric; also several methods of producing same.

3,617,345

METHOD OF MANUFACTURING ALUMINUM COATED FERROUS BASE ARTICLES

Melvin H. Brown, Leechburg, and Maurice W. Wei, Lower Burrell, both of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Oct. 30, 1969, Ser. No. 872,768
Int. Cl. C23c *1/08;* C23f *17/00*
U.S. Cl. 117—51 6 Claims

A process for coating a ferrous metal article with aluminum including cleaning the ferrous article, applying to the surface of the ferrous article a flux of about 0.125 to 4% aqueous solution of an organic aromatic carboxylic acid having one carboxyl group and a phenolic hydroxyl group, drying the ferrous article and subsequently applying molten aluminum to the ferrous article. The coating process wherein the acid is salicylic acid or 5-chlorosalicylic acid employed in concentrations of about 1 to 4%. Applying the flux to the ferrous metal article surface by immersion of the article in a flux bath having a temperature of about 100 to 212° F. for a period of about 1 to 2 minutes.

3,617,346

AZIRIDINE ADDUCTS OF α,β-UNSATURATED NITRILES AND POLYMERS THEREOF

Leon H. Chance, New Orleans, and George L. Drake, Jr., Metairie, both of La.

Filed Mar. 25, 1969, Ser. No. 810,371
Int. Cl. B44d *1/092;* D06p *3/60*
U.S. Cl. 117—56 1 Claim

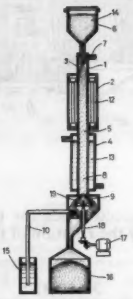
This invention relates to a process for pretreating cellulosic fabrics with acid catalysts, and then impregnating said fabrics with aziridine adducts of α,β-unsaturated nitriles.

3,617,347

PROCESS FOR THE PRODUCTION OF A SILICON-COATED DIAMOND POWER

Tatsuo Kuratomi, 4-2-18, Hamatake, Chigasaki, Kanagawa Prefecture, Japan

Filed Nov. 12, 1969, Ser. No. 875,912
Claims priority, application Japan, Nov. 19, 1968, 43/84170
Int. Cl. C09c *1/68*
U.S. Cl. 117—69 1 Claim



The feature of the present invention consists in forming silicon in nascent state on the surface of diamond powder, heating so as to form a thin film of silicon carbide on the bond surface of diamond with the silicon through covalent bonds and then forming silicon in nascent state on said thin film of silicon carbide whereby to form a film of silicon.

3,617,348

METHOD AND APPARATUS FOR THE EVAPORATION OF CHROMIUM-SILVER

Dale T. Kelley, Phoenix; Billy E. Smith, Phoenix, and Richard W. Wilson, Scottsdale, all of Ariz., assignors to Motorola, Inc., Franklin Park, Ill.

Filed Oct. 15, 1969, Ser. No. 866,483
Int. Cl. C23c *13/02, 13/12*
U.S. Cl. 117—71 7 Claims

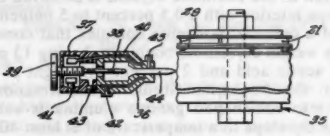
Disclosed is a method and apparatus for the vacuum evaporation of chromium-silver metallization on a silicon substrate by which the chromium adherence is improved and by which very large quantities of silver may be deposited in a short time. The evaporative system described will form a chromium-silver multilayer which adheres tightly to a substrate such as silicon. This system is feasible for the fast large-scale production formation of chromium-silver layers on silicon. The fast evaporative rate of the silver is accomplished by the use of a silver wettable insert in a silver non-wettable crucible.

3,617,349

METHOD OF MAKING ANTI-FRICTION PISTON RINGS

Herbert F. Prasse, Town and Country, Mo., assignor to Ramsey Corporation, St. Louis, Mo.

Filed Oct. 20, 1969, Ser. No. 867,632
Int. Cl. B05b *7/20*; F02f *3/10*
U.S. Cl. 117—71 M 13 Claims



Covers a piston ring having a bearing face coated with a hard porous metal or metal alloy having its pores impregnated therein with a solid antifriction agent. The ring is produced by first coating its bearing face with a hard porous metal or metal alloy and then heating the coated ring to drive the air from the pores of the coating. Thereafter, the ring is contacted while still hot with an antifriction agent dissolved or dispersed in a liquid carrier. The antifriction agent is drawn into the pores of the coating and remains therein as an impregnant of said coating, while the liquid carrier upon contacting the heated piston ring is evaporated therefrom.

3,617,350

METHOD OF COATING MAGNESIUM AND MAGNESIUM ALLOY ARTICLES

Henry A. Kuchek, Auburn, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed June 3, 1968, Ser. No. 733,810
Int. Cl. B44c *3/02, 3/00*
U.S. Cl. 117—71 M 6 Claims

A method of coating a fine particulate material on magnesium or magnesium alloy articles employing discrete carrier particles to apply a filming liquid and the fine particulate coating material to the article surface in separate steps.

3,617,351

PROCESS OF COATING WITH AN OLEFIN POLYMER

Wendell P. Long, Wilmington, Del., and Bert H. Mahlman, West Chester, Pa., assignors to Hercules Incorporated, Wilmington, Del.

Continuation-in-part of application Ser. No. 606,047, Dec. 30, 1966. This application Oct. 17, 1969, Ser. No. 867,389
Int. Cl. B44d *1/14*; B32b *15/08*
U.S. Cl. 117—75 15 Claims

A method of applying a coating to a metallic, cellulosic, or other type of substrate which comprises applying to the substrate a colloidal dispersion of particles of an α-olefin polymer or copolymer and thereafter heating the coated substrate to a temperature above the softening point of the polymer to evaporate the diluent and fuse the polymer into a continuous coating. The polymer particles are substantially all within the size range between about 0.02 and 0.5 micron, dispersed in an inert diluent.

3,617,352

PROCESS, AGENT AND ARTICLE RELATING TO IMPROVED ADHESION BETWEEN A SHAPED ARTICLE OF A CRYSTALLINE POLYESTER AND RUBBER

Takeo Shima, 1, 3-chome, Yamate-cho; Yukiharu Asami, 1, 3-chome, Yamate-cho; Shunzo Ishizaki, 11, 4-chome, Nishimi; Shoji Kawase, 9, 2-chome, Yamate-cho, and Masao Yoshimura, 9, 2-chome, Yamate-cho, all of Iwakuni-shi, Yamaguchi-ken, Japan

Continuation-in-part of application Ser. No. 612,335, Jan. 30, 1967. This application Jan. 15, 1968, Ser. No. 697,586
Claims priority, application Japan, Feb. 2, 1966, May 16, 1966, Nov. 9, 1966; 41/6057, 41/31310, 41/73672
Int. Cl. B32b *27/08, 25/08*
U.S. Cl. 117—76 F 7 Claims

Improvement in adhesion of articles, e.g. tire cord of ethylene terephthalate or 2,6-naphthalate polyester to rubbers. The article is coated with a polyester polyurethane polymer containing segments derived from an ethylene terephthalate or 2,6-naphthalate polyester. Ratio of said segments to the balance in the polyurethane is 1:6 to 6:1. The article is then baked. Preferred coating agents for articles of an ethylene terephthalate polyester contain ethylenical unsaturations unsaturations and/or segments derived from an ethylene terephthalate polyester modified by a chain branching agent, e.g. pentaerythritol, and having a reduced viscosity of 0.1 to 0.3. Introduction of alkali metal sulfonate groups to the polyurethane is advantageous.

3,617,353

SOIL RELEASE CHEMICALS AND METHOD OF APPLICATION TO GLASS FABRIC OR FIBER

William J. Cooney, North Providence, R.I., assignor to Chas. S. Tanner Co., Warwick, R.I.

Filed June 3, 1968, Ser. No. 733,794
Int. Cl. C03c *25/02*; B32b *17/04*
U.S. Cl. 117—76 T 5 Claims

Soil release for application to glass fibers and fabrics which have been treated with acrylic resin, or acrylic resins, and

dyes to give the fibers a base coat, which soil release comprises an aqueous emulsion of copolymers of acrylic or methacrylic acids with ester of acrylic or methacrylic acid, wherein the proportion of acid is high, ranging from about 25 to 80 percent acid, by weight, in combination with an aqueous solution of a nonyl or octyl phenol, reacted with from 9 to about 50 moles of ethylene oxide, and aqueous solution of a fatty alcohol or acid, which also has been reacted with 5 to 50 percent of ethylene oxide, the composition thus prepared being used as a finish bath treatment for glass fibers which have already been dyed or had a base color coating applied thereto, thereby to apply over the base color layer on a glass fiber or fabric a second molecular or semimolecular layer of this resinous material, which functions as a soil release and, also, by controlling the base dye system and amount of soil release obtain a fabric which is flame retardant.

3,617,354

PHOTOGRAPHIC PRINTS COATED WITH ANTIREFLECTION LAYER

Walter H. Carnahan; Donald R. Morey, and Robert G. Spahn, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 8, 1969, Ser. No. 848,698
Int. Cl. B44d *1/14*; G03c *11/08*
U.S. Cl. 117—76 P **5 Claims**

An antireflection coating consisting of a thin transparent layer of a polymerized perfluorinated olefin is applied over the image-bearing photographic emulsion layer of a photographic print to reduce surface reflection of light and provide increased density and enhanced contrast. The antireflection layer also serves as a protective coating for the print.

3,617,355

METHOD OF APPLYING WATER AND OIL REPELLENT FINISH FOR SYNTHETIC FIBROUS MATERIALS

Wilhelm Loffler, Kelkheim, Taunus, and Martin Rieber, Schonberg, Taunus, both of Germany, assignors to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning, Frankfurt Main, Germany

Filed Dec. 30, 1969, Ser. No. 889,351
Claims priority, application Germany, Jan. 3, 1969, P 19 00 234.7
Int. Cl. B44d *1/50*
U.S. Cl. 117—93.31 **8 Claims**

Process for rendering foils and fibrous materials water and oil repellent by grafting onto these substrates a perfluoro n-alkyl-vinyl ether under simultaneous use of trifluoroacetic acid and/or methylene chloride under the action of a grafting initiator.

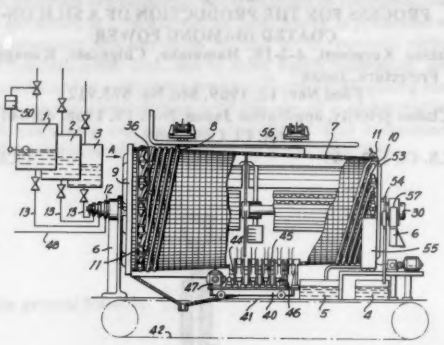
3,617,356

A METHOD FOR APPLYING LATEX COATINGS TO THE INNER SURFACES OF TUBULAR ARTICLES OF WOVEN CLOTH

Alexandr Nikolaevich Demin, Moscow; Valentina Sergeevna Varfolomeeva, Serpukhov, Moskovskoi Oblasti, and Alevtina Alexandrovna Demina, Moscow, all of U.S.S.R., assignors to Tsentralnoe Proektno-Konstruktorskoe I Tekhnologicheskoe Bjuro Legkoi, Moscow, U.S.S.R.

Filed Apr. 25, 1968, Ser. No. 724,163
Int. Cl. B44d *1/09*
U.S. Cl. 117—95 **5 Claims**

A latex coating is formed on the inner surface of a tubular article by winding the article in the form of a helix on a rotatable drum and successively feeding the article with chemical components which are to form the coating. The chemical components are admitted to the tubular article via a valve means and controlled by a distributor and the spent chemical components are discharged from the outlet of the tubular article and fed to receiving containers. The chemical



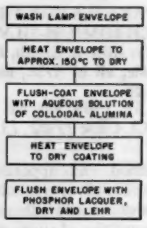
components are advanced inside the tubular article by rotation thereof caused by the rotation of the drum.

3,617,357

LAMP ENVELOPE WITH A THIN TRANSPARENT BUFFER FILM ON ITS INNER SURFACE

Rudolph Nagy, Lake Elsie, Wis., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Division of Ser. No. 776,624, Nov. 18, 1968, Pat. No. 3,541,377.
Filed Mar. 25, 1970, Ser. No. 22,478
Int. Cl. C03c *17/22, 17/02*
U.S. Cl. 117—97 **6 Claims**


WASH LAMP ENVELOPE
HEAT ENVELOPE TO APPROX. 150°C TO DRY
FLUSH-COAT ENVELOPE WITH AQUEOUS SOLUTION OF COLLOIDAL ALUMINA
HEAT ENVELOPE TO DRY COATING
FLUSH ENVELOPE WITH PHOSPHOR LACQUER, DRY AND LEHR

The inner surface of a soda-lime-silicate glass envelope for a fluorescent lamp or similar mercury-discharge device is coated with a thin film of submicroscopic fibrous crystals of boehmite (A10(OH)) prior to the phosphor coating operation. The envelope is subsequently heated to thermally decompose the boehmite crystals in situ and transform them into fibrils and rodlike particles of gamma alumina (Al_2O_3) that are bonded to the glass surface. The heating is advantageously achieved during the bulb-lehring operation after the bulb is coated with phosphor. The gamma alumina particles chemically react with the sodium and other alkali constituents of the glass to form inert compounds and thus provide a transparent "buffer" film which, in the finished lamp, inhibits the formation of black alkali-mercury deposits on the inner surface of the envelope during lamp operation. The lumen maintenance of the lamp is accordingly enhanced.

Deposition of the boehmite crystals is achieved by coating the envelope interior with a 0.5 percent to 5 percent aqueous solution of a colloidal boehmite complex that consists of 85 percent by weight crystalline boehmite, having 13 percent by weight of acetic acid and 2 percent by weight of water attached to the boehmite fibrils. Transformation of the boehmite into rod-shaped gamma alumina is achieved by heating the envelope to a temperature of at least 400° C. percent by weight of acetic acid and 2 percent by weight of water attached to the boehmite fibrils. Transformation of the boehmite into rod-shaped gamma alumina is achieved by heating the envelope to a temperature of at least 400° C.

3,617,358

FLAME SPRAY POWDER AND PROCESS

Ferdinand J. Dittrich, Bellmore, L.I., N.Y., assignor to Metco Inc., Westbury, L.I., N.Y.

Filed Sept. 29, 1967, Ser. No. 671,880
Int. Cl. B44d 1/097
U.S. Cl. 117—105.2 35 Claims

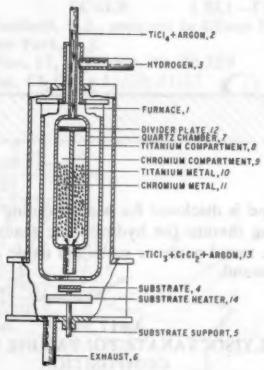
The flame spraying of the flame spray powder which has been formed by spray drying of a slip or slurry of fine particles of a flame spray material. This flame spray powder has individual particles which are of substantially spheroid shape, of a size between about 20 mesh and 1 micron, and are formed of multiple subparticles bound together without fusion by a spray-dried binder and having a crush resistance of at least 0.7 grams. For the spray drying, fine particles of any known or conventional flame spray material or combination thereof, such as metals, ceramics, carbides, etc., suspended in a slip or slurry of a liquid, preferably water, with a suitable binder and preferable auxiliary agents, is atomized into a hot drying gas stream forming the spheroid larger composite particles.

3,617,359

PROCESS FOR THE VAPOR DEPOSITION OF METALS

Gene F. Wakefield, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 579,963, Sept. 16, 1966, Pat. No. 3,428,607.
Filed Jan. 13, 1969, Ser. No. 817,591
Int. Cl. C23c 11/02
U.S. Cl. 117—107.2 R 6 Claims



A method of vapor depositing metal on a substrate by reducing titanium and chromium halides with hydrogen under controlled conditions to chemically vapor deposit titanium and chromium alloys on the substrate. Best results are obtained when the halides are introduced into the deposition chamber as a gaseous mixture with an inert gas carrier.

3,617,360

HIGH TEMPERATURE METALLIC DIFFUSION COATING AND METHOD

David J. Levine, Cincinnati, Ohio, assignor to General Electric Company

Filed Nov. 29, 1968, Ser. No. 780,177
Int. Cl. C23c 9/02
U.S. Cl. 117—107.2 P 4 Claims

Improved oxidation and sulfidation resistance can be imparted to a high-temperature metallic diffusion coating diffusion bonded with metallic surface, such as a nickel, cobalt or iron base alloy surface, by embedding in a coating outer portion between about 5 and 50 volume percent of oxide particles of up to about 20 microns in size and thermally stable to at least about 2000° F.

3,617,361

MANUFACTURE OF PRESSURE-SENSITIVE ADHESIVE ARTICLES

Hans Reinhard, Limburgerhof; Klaus Gulbins, Limburgerhof, and Bernhard Dotzauer, Maxdorf, all of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen am Rhine, Germany

Filed Jan. 26, 1970, Ser. No. 5,947
Claims priority, application Germany, Jan. 31, 1969, P 19 04 743.9
Int. Cl. C09j 7/04
U.S. Cl. 117—122 PA 8 Claims

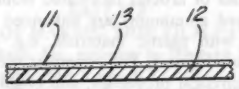
Manufacture of pressure-sensitive adhesive coatings on flat substrates by coating the substrates with dispersions of copolymers (A) comprising 30 to 99.5 percent by weight of acrylic and/or methacrylic acid esters of C_1 to C_3 alkanols, 0.5 to 20 percent by weight of monoesters of C_3 to C_5 α,β-olefinically unsaturated mono- or dicarboxylic acids and C_2 to C_6 polyhydric alcohols and/or N-alkoxy-methyl amides of C_3 to C_5 α,β-olefinically unsaturated carboxylic acids, 0 to 50 percent by weight of vinyl esters of C_2 to C_{18} monocarboxylic acids, styrene, acrylonitrile and/or methycrylonitrile and 0 to 15 percent by weight of α,β-olefinically unsaturated C_3 to C_5 carboxylic acids and/or their amides, in liquid hydrocarbons containing, as protective colloids, 25 to 150 percent by weight of the dispersed copolymer (A) of a dissolved copolymer (B) comprising 80 to 99.5 percent by weight of acrylic and/or methacrylic acid esters of C_4 to C_{18} alkanols and 0.5 to 20 percent by weight of monoesters of C_3 to C_5 α,β-olefinically unsaturated mono- or dicarboxylic acids and C_2 to C_6 polyhydric alcohols and/or N-alkoxy-methyl amides of C_3 to C_5 α,β-olefinically unsaturated carboxylic acids, and also optionally up to two molar proportions of a polyvalent isocyanate, based on the sum of the proportions of free hydroxyl and carboxyl groups in the copolymers (A) and (B), and drying the coated substrates.

3,617,362

ACRYLATE ADHESIVE TAPE AND COMPOSITION

Cyrus W. Bemmels, North Brunswick, and Donald F. Doehnert, Millington, both of N.J., assignors to Johnson & Johnson

Filed July 11, 1968, Ser. No. 744,173
Int. Cl. C09j 7/02
U.S. Cl. 117—122 8 Claims



A self cross-linking pressure-sensitive acrylate adhesive and tape based on an adhesive copolymer of monomers comprising a major amount of a medium chain length alkyl acrylate monomer and preferably a minor amount of a cohesion inducing short chain monomer, plus a very small amount of an alkoxy silyl polymerizable cross-linking monomer and a relatively small amount, i.e., about 2–6 parts by weight of the total monomer solids, of a catalytic acid monomer selected from the group consisting of acrylic acid, methacrylic acid, and itaconic acid. The catalytic acid monomer acts as a built-in or internal catalyst which causes the adhesive copolymer to be self cross-linking. A stabilization system for this self cross-linking system also is disclosed.

3,617,363

PROCESS FOR ELECTROLESS METALLIZING INCORPORATING WEAR-RESISTING PARTICLES

Willy Metzger; Rudi Ott; Gunter Pappe, and Helmut Schmidt, all of Solingen-Merscheid, Germany, assignors to General American Transportation Corporation, Chicago, Ill.

Filed Jan. 16, 1968, Ser. No. 698,129
Claims priority, application Germany, Jan. 18, 1967, B 90776
Int. Cl. C23c 3/02
U.S. Cl. 117—130 37 Claims

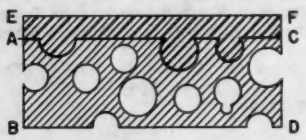
There are disclosed processes for electroless metallizing workpieces to provide thereon a metal coating incorporating therein nonmetallic wear-resisting particles and the coated workpieces produced by such processes, the processes comprising contacting the workpieces with an electroless metallizing bath consisting of an aqueous solution of a metal salt and an electroless reducing agent therefor and a quantity of nonmetallic wear-resisting particles, wherein the particles are essentially insoluble in the plating bath and are noncatalytic and inert with respect thereto, the particles being present in the bath in an amount by weight no greater than about four times the weight of the metal in the bath expressed as free metal, and maintaining the particles in suspension throughout the bath during the metallizing of the workpiece; the electroless coating with the wear-resisting particles therein may be heat treated by heating to an elevated temperature in the range 100° C. to 600° C. for one hour or more further to harden the coating.

3,617,364

PLASTIC-COATED METALLIC FOAMS

Chester P. Jarema, Detroit, and Leonard M. Niebylski, Birmingham, both of Mich., assignors to Ethyl Corporation, New York, N.Y.

Filed Nov. 12, 1968, Ser. No. 774,756
Int. Cl. B32b 15/08
U.S. Cl. 117—132 B 10 Claims



The properties of articles fabricated from foamed metals (such as foamed aluminum) are enhanced by coating surfaces thereof with plastic materials, e.g. acrylonitrile-butadiene-styrene polymers. For example, the plastic coating improves the physical properties, and enables the article to be joined to another foamed metal article, or to a metal sheet, wire, glass, rock or other material. The organic coat gives improved strength to such joint.

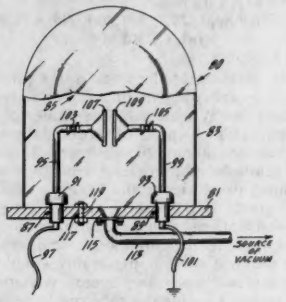
3,617,365

COMPOSITE COATED WITH ACETYLENE-OXYGEN POLYMERS

Charles Donald Fisher, Princeton, N.J., assignor to American Can Company, New York, N.Y.

Division of Ser. No. 587,827, Oct. 19, 1966, Pat. No. 3,457,156.
Filed Mar. 25, 1969, Ser. No. 855,786
Int. Cl. B32b 15/08
U.S. Cl. 117—132 4 Claims

A composition and composite article are disclosed, including process for their production, involving the provision on a conductive or dielectric substrate of a coating made up primarily of polyacetylene, deposited with use of an electrical discharge from an atmosphere of acetylene and then oxygenated, the oxygenated polymer being chemically inert and having a high decomposition temperature.

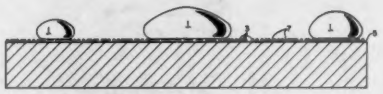


3,617,366

METAL WARE HAVING WATERPROOF SURFACE AND PROCESS FOR MAKING

Paul R. Tully, Lowell; William J. Fletcher, Saugus, and Hector Cochrane, Groveland, all of Mass., assignors to Cabot Corporation, Boston, Mass.

Filed Feb. 7, 1969, Ser. No. 797,467
Int. Cl. B44d 1/34
U.S. Cl. 117—135.1 9 Claims



A method is disclosed for waterproofing metallic surfaces by applying thereto the hydrophobic reaction product of a particulate metal oxide or metalloid oxide and an organosilicon compound.

3,617,367

POLYISOCYANATE-POLYAMINE COATING COMPOSITION

Lowell O. Cummings, San Anselmo, Calif., assignor to Pacific Vegetable Oil Corporation, San Francisco, Calif.

Continuation-in-part of application Ser. No. 586,381, Oct. 13, 1966, now abandoned. This application Jan. 11, 1968, Ser. No. 696,988
Int. Cl. C08g 22/02
U.S. Cl. 117—161 LN 4 Claims

A cured coating comprising the reaction of the product between a polyamine and certain polyisocyanates, including polyester polyisocyanates and aromatic and aliphatic isocyanates, with the ratio of amine groups to polyisocyanate groups lying to the range of 3:1 to 1:3. Also a two-system spray system for forming rapid cure coatings of that type.

3,617,368

PROCESS FOR PREPARING INHERENTLY COLLOIDALLY STABLE INTERPOLYMERS IN AQUEOUS DISPERSION AND PRODUCTS COATED THEREWITH

Dale S. Gibbs, and Ritchie A. Wessling, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Nov. 8, 1968, Ser. No. 774,480
Int. Cl. B32h 27/06; B32b 27/30
U.S. Cl. 117—161 UT 2 Claims

This invention is directed to improved coated products comprising essentially a substrate having a dried, continuous

adherent coating of certain colloidally stable polymer latexes thereon which latexes are essentially devoid of conventional wetting agents or surfactants. More particularly, the invention concerns the use as coating materials of polymer latexes containing as the essential ingredient therein, an interpolymer prepared by the essentially continuous addition polymerization in aqueous dispersion of major proportions of an essentially hydrophobic monomer, specified minor proportions of a second relatively hydrophilic ethylenically unsaturated "go-between" comonomer and specified minor proportions of certain copolymerizable ionic water-soluble materials. These latexes are particularly useful for preparing coated products comprising a substrate having a continuous, adherent, dried coating of the latex thereon, which coating has excellent barrier, flexiblity, heat-seal and binding capacity properties.

3,617,369

WATER-SOLUBLE POLYVINYL ALCOHOL-COATED WAX SHEET

Mariano D. Lombardo, 7 Lodge Lane, Parsippany, N.J.

Filed Jan. 8, 1969, Ser. No. 789,851
Int. Cl. B28b *7/36;* **B32b** *27/06*
U.S. Cl. 117—161 UE **1 Claim**

Disclosed is a wax sheet coated with a water-soluble polyvinyl alcohol, said sheet being uniformly perforated. The coated perforated sheet is used to form the integral thermal chamber of a mold or structural part.

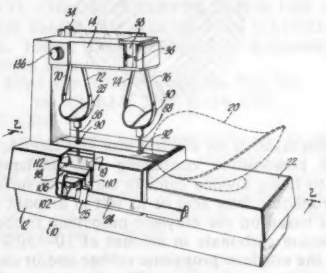
A method of making the structural part is also provided.

3,617,370

APPARATUS FOR REGULATING THE OPERATION OF A SCALE

Earl D. Myers, Westfield, N.J., assignor to Ohaus Scale Corporation, Florham Park, N.J.

Filed Nov. 17, 1970, Ser. No. 90,350
Int. Cl. G01g *23/10, 21/22*
U.S. Cl. 177—185 **13 Claims**



A compound lever scale having a ratio lever beam in an upper housing, operatively connected to a load beam assembly contained in a lower section of the scale. Ratio pans are suspended from the ratio lever beam by knife edges extending perpendicularly from the ratio lever beam to restrain movement of the ratio pans in the plane perpendicular to the length of the ratio lever beam. Magnetic damping means operatively connected to the ratio pans suppress swinging of the ratio pans and oscillations of the entire lever system of the scale. A spring device connecting the ratio lever beam with its housing allows adjustment of torque exerted on the ratio lever beam to enable a rapid zero-adjustment for the entire scale.

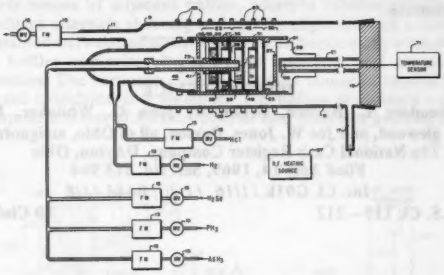
3,617,371

METHOD AND MEANS FOR PRODUCING SEMICONDUCTOR MATERIAL

Robert A. Burmeister, Jr., Los Altos, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Nov. 13, 1968, Ser. No. 775,396
Int. Cl. H01l *7/36;* **B44d** *1/02, 1/18*
U.S. Cl. 117—201 **7 Claims**

A vertical vapor-phase reactor for growing semiconductor materials such as Group III–V compounds on suitable substrates includes at least three spaced chambers disposed within a susceptor which is inductively heated. Gases of selected composition flow downwardly through the reactor in separate streams. One or more gas streams flow through regions containing sources of elements which react with the



gases, and another gas stream flows through the reactor in a manner which bypasses the source region. The gas streams are combined in a mixing region downstream of the source region and the mixture of gases is then passed over a heated substrate in a growing region downstream of the mixing region.

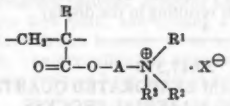
3,617,372

ELECTROCONDUCTIVE PAPER

Raymond W. McNamee, Jr., Horsham; Norman Shachat, Levittown, and Frank J. Glavis, Rydal, all of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed Aug. 20, 1969, Ser. No. 851,744
Int. Cl. G03g *7/00;* **B44d** *1/00*
U.S. Cl. 117—201 **8 Claims**

An electroconductive paper useful in electrostatic image reproduction techniques containing a polymer comprising units of the formula:



(I)

wherein

R is H or CH_3, R^1 is hydroxyethyl or hydroxypropyl group, R^2 is a (C_1-C_4) alkyl group

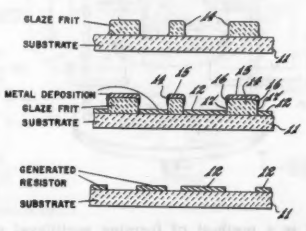
R^3 is a (C_1-C_4) alkyl group, and X is an anion.

3,617,373

METHODS OF MAKING THIN FILM PATTERNS

James H. Mott, Bath, Pa., assignor to Western Electric Company, Incorporated, New York, N.Y.

Filed May 24, 1968, Ser. No. 731,899
Int. Cl. B44d *1/18;* **C23c** *15/00, 13/02*
U.S. Cl. 117—212 **3 Claims**



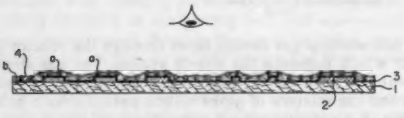
Deposition of patterned thin-films of metal or metal compounds on a substrate is accomplished using a dissolvable

glaze-frit mask. The frit, in pasty form, is applied to the substrate in a negative pattern. After the frit is hardened by heating, the film is deposited over the surface, including the substrate and frit pattern. The frit is then removed with a selective solvent. The layer of film overlying the frit is removed with the frit to leave the desired film pattern on the substrate.

3,617,374
DISPLAY DEVICE

Theodore L. Hodson, Bellbrook; John G. Whitaker, Englewood, and Joe W. Jones, Dayton, all of Ohio, assignors to The National Cash Register Company, DAyton, Ohio

Filed Apr. 14, 1969, Ser. No. 815,966
Int. Cl. G01k *11/16, 11/20;* B44d *11/8*
U.S. Cl. 117—212 **10 Claims**

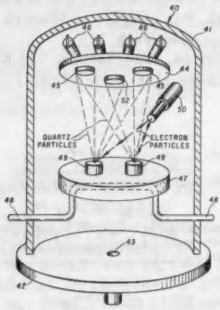


The present disclosure is directed to articles of manufacture, e.g., display devices, having self-contained controlled resistor means for generation of heat upon electrical activation, which means can be formed in any desired configuration and thickness, and an encapsulated liquid crystal layer responsive to variations in heat to present a display, which can be polychromatic. The resistor is comprised of conductive ink deposited on one major surface (usually the lower surface) of an opaque, substantially electrically nonconductive layer having a layer of encapsulated cholesteric liquid crystals in direct contact with at least a portion of the other major (e.g., upper) surface of the opaque layer. Heating due to the resistor produces reversible color changes in the encapsulated liquid crystals resulting in the display.

3,617,375
ELECTRON BEAM EVAPORATED QUARTZ INSULATING MATERIAL PROCESS

Daniel A. Marek, Irving; Kurt W. Kreiselmaier, Dallas, and James H. Van Tassel, Dallas, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of application Ser. No. 492,339, Oct. 1, 1965, now abandoned. This application Aug. 11, 1969, Ser. No. 863,408
Int. Cl. B41m *3/08*
U.S. Cl. 117—217 **3 Claims**



Disclosed is a method of forming multilevel electrically conductive interconnections for microminiature devices by electron beam evaporation of a layer of quartz over the first level of interconnections. A second level of interconnections are formed on the quartz layer and make ohmic contact to the first level of interconnections through openings in the quartz layer.

3,617,376
ANTISUBLIMATION COATING AND METHOD FOR THERMOELECTRIC MATERIALS

Norman C. Miller, Woodland Hills, Calif., assignor to North American Rockwell Corporation

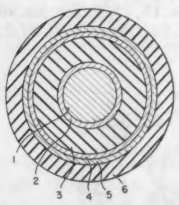
Filed Mar. 16, 1967, Ser. No. 623,531
Int. Cl. B44d *1/097;* C23c *13/00;* H01v *1/00*
U.S. Cl. 117—221 **10 Claims**

A protective ceramic composition and method for protecting thermoelectric elements, particularly those which are tellurium-containing, from sublimation. A thin coating of a metal oxide having the formula M_2XO_3 is applied to the thermoelectric material, wherein M is an alkali metal and X is a Group IVB metal (Ti, Zr, Hf). Further electrical connection of copper straps may be made to the thermoelectric element contact caps by brazing in a reducing atmosphere thereby reducing at least a portion of the M_2XO_3 to M_2XO_2.

3,617,377
INSULATION CONSISTING OF ETHYLENE-PROPYLENE RUBBER COMPOSITION FOR ELECTRIC WIRE AND CABLE

Setsuya Isshiki, Funabashi-shi; Kaoru Saito, Tokyo, and Hideo Sunazuka, Tokyo, all of Japan, assignors to The Fujikura Cable Works Limited, Tokyo, Japan

Filed June 6, 1967, Ser. No. 643,931
Claims priority, application Japan, June 10, 1966, 41/37403
Int. Cl. H01b *3/30*
U.S. Cl. 117—224 **2 Claims**

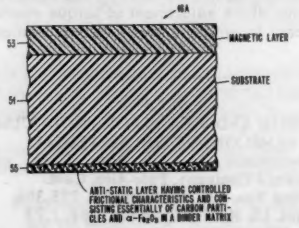


Insulation material for electric wire and electric cable consisting of composition containing (a) ethylene-propylene rubber, (b) finely divided calcium carbonate surface-treated with hydrophobic fatty acid or its salt in amount of 10–80% by weight based on the ethylene-propylene rubber, and (c) heavy calcium carbonate in amount of 10–150% by weight based on the ethylene-propylene rubber and/or carbon black having particle size of at least 100 μ in amount of 1–80% by weight based on the ethylene-propylene rubber.

3,617,378
MAGNETIC RECORDING MEDIA

Charles K. Beck, Boulder, Colo., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 29, 1969, Ser. No. 861,773
Int. Cl. H01f *10/00*
U.S. Cl. 117—226 **5 Claims**



This invention discloses a magnetic recording medium in the form of a nonconductive substrate having two surfaces,

one surface being coated with a magnetic recording material and the other surface being coated with a composition exhibiting selected properties as to its resistivity and as to its coefficient of friction with regard to its use in a media handling system. Also, a media handling system, including such a magnetic recording media, is disclosed.

3,617,379

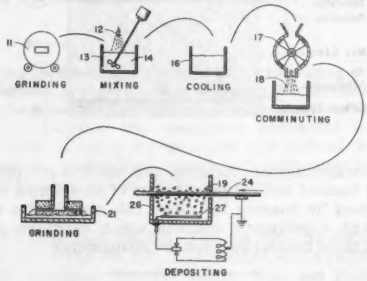
ELECTRICAL INSULATION COATING CONTAINING PARTICLES OF INORGANIC SUBSTANCE OF DIELECTRIC CONSTANT NO LESS THAN 1500

William W. Ulmer, and Wesley W. Pendleton, both of Muskegon, Mich., assignors to Annaconda Wire and Cable Company

Continuation-in-part of application Ser. No. 681,198, Nov. 7, 1967. This application Aug. 5, 1968, Ser. No. 750,240

Int. Cl. H01b *3/30*

U.S. Cl. 117—224 **4 Claims**



Very fine particles of ferrite or other high-dielectric-constant substances are dispersed in a coating resin before it is solidified and powdered for electrostatic deposition.

3,617,380

POLYVINYL CHLORIDE SUPPORTS FOR USE AS THE BASE OF MAGNETIC RECORDING MATERIALS

Hirosi Usui, Tokyo, Japan, assignor to Kabushiki Kaisha Ricoh, Tokyo, Japan

Filed Apr. 16, 1968, Ser. No. 721,762

Int. Cl. B32b *5/16;* **G11b** *5/70*

U.S. Cl. 117—235 **3 Claims**

A sheet-, card- or tape-form support for use as the base of a magnetic recording material, comprising a polyvinyl chloride base containing, dispersed therein, an acrylonitrile-butadiene-styrene copolymer or an acrylonitrile-butadiene copolymer in an amount ranging from 3 to 30 percent by weight of said polyvinyl chloride.

3,617,381

METHOD OF EPITAXIALLY GROWING SINGLE CRYSTAL FILMS OF METAL OXIDES

Joseph John Hanak, Trenton, N.J., assignor to RCA Corporation

Filed July 30, 1968, Ser. No. 748,757

Int. Cl. C01g *49/00*

U.S. Cl. 117—235 **7 Claims**

A method of epitaxially growing single crystal ferrite films by vapor transport comprises forming gaseous metal halides from metal oxides and decomposing these metal halides to form a single crystal film of a desired ferrite composition upon a single crystal substrate.

3,617,382

MIXING APPARATUS AS USED IN MASS AND HEAT TRANSFER PROCESSES

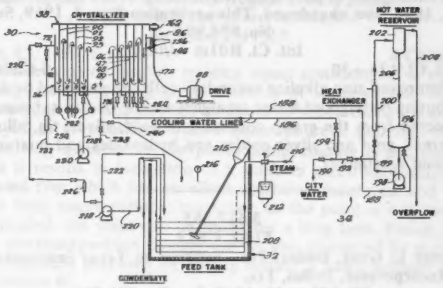
Christos B. Natsis, Lisle, and John T. Horton, Chicago, both of Ill., assignors to Christos B. Natsis, Wilmette and John T. Horton, Hinsdale, Ill.

Filed July 17, 1968, Ser. No. 745,423

Int. Cl. C13k *1/10;* **B01d** *9/00;* **B01f** *7/12*

U.S. Cl. 127—15 **21 Claims**

Mixing apparatus includes a bank of spaced parallel baffles, extending horizontally, vertically or at an angle, closure means providing with the baffles a tortuous flow path through the bank, and means mounting the baffles for relative rotation between adjacent baffles, the baffles including rib means projecting laterally from opposite sides thereof and extending transversely of the direction of relative rotation, and the rib means preferably projecting into close proximity to rib means of adjacent baffles, whereby relative rotation produces alternate shearing and mixing of portions of a fluid contained between adjacent baffles. The horizontally extending baffles comprise alternate disc members and annular members. The vertically extending baffles comprise vertically coaxial cylindrical ring members. The baffles at an angle can comprise a series of vertical coaxial ring members positioned



conically, or they can be curved configurations. The rib means may comprise conduit means for circulating a heat transfer fluid through the baffles. The apparatus may be adapted as a crystallizer by providing fluid inlet and outlet means at opposite ends of the flow path, and recycle conduit means interconnecting the inlet and outlet means.

A continuous process for crystallizing a substance from a viscous solution comprises conducting the solution in a tortuous flow path through the mixing apparatus, producing relative rotation between adjacent baffles, cooling the solution in the flow path, and cycling a product crystal slurry from a downstream location to an upstream location in the flow path. The crystallization process may be employed for crystallizing dextrose from aqueous solution.

3,617,383

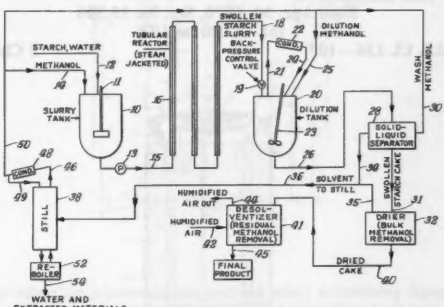
PROCESS FOR PREPARING GRANULAR COLD-WATER-SWELLING STARCHES AND THE STARCHES RESULTING THEREFROM

Richard A. Thurston, Danville, and Richard E. McConiga, La Grange Park, both of Ill., assignors to CPC International Inc., New York, N.Y.

Filed Aug. 11, 1967, Ser. No. 659,916

Int. Cl. C13l *1/08*

U.S. Cl. 127—71 **19 Claims**



Starches, the granules of which are substantially completely intact and which have lost from about 40 percent to 100

percent birefringence, which will rapidly hydrate in cold water to form smooth, viscous pastes, are prepared as follows. Nongelatinized starch is slurried with (1) a solvent for starch (preferably water), and (2) an organic liquid which is miscible with the solvent for starch (e.g., methanol); the slurry is continuously passed through a confined zone wherein it is subjected to gelatinizing conditions. The process conditions are so selected as to produce the desired end product.

3,617,384
ZINC ALKALINE SECONDARY CELL

Toshiso Kamai, and Sumio Uchida, both of Ibaraki, Japan, assignors to Hitachi Makuseru Kabushiki Kaisha, also known as Hitachi Maxell, Ltd., Osaka Prefecture, Japan

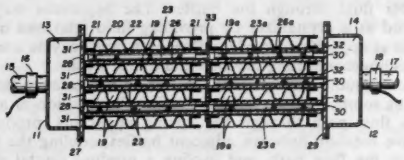
Continuation-in-part of application Ser. No. 571,907, Aug. 11, 1966, now abandoned. This application Nov. 7, 1969, Ser. No. 874,994
Int. Cl. H01m *43/02*
U.S. Cl. 136—30 **6 Claims**

Improved zinc-alkaline secondary cells are provided by distributing throughout a zinc amalgam anodic body a substance selected from the group consisting of gold, silver, tin, alloys thereof, gold and silver oxides and hydroxides and mixtures of said substances.

3,617,385
FUEL CELL

Foster L. Gray, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 13, 1969, Ser. No. 806,838
Int. Cl. H01m *27/04*
U.S. Cl. 136—86 **8 Claims**

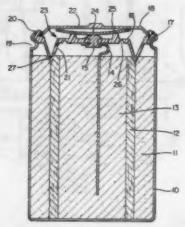


A fuel cell electrode subassembly for a multicell power package having at least a pair of thin, porous, elongated electrodes, e.g. cathodes, which are operatively spaced to receive an anode carrying a molded matrix and are connected in series to a third thin, porous electrode, e.g. an anode, which is aligned with the space between the first two electrodes hermetically sealed with an electrically conductive material. Each subassembly can be interfitted with other subassemblies to yield several series connected fuel cell arrays.

3,617,386
SEALED CELL CONSTRUCTION

Robert J. Bosben, Madison; Ralph H. Feldhake, Verona, and Patrick J. Spellman, Middleton, all of Wis., assignors to ESB Incorporated

Filed Apr. 30, 1970, Ser. No. 33,306
Int. Cl. H01m *1/06*
U.S. Cl. 136—107 **5 Claims**

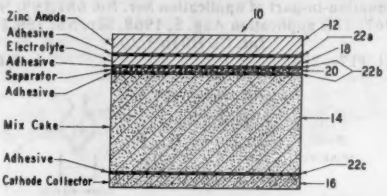


A sealed electric battery cell having a single plastic member which seals the cell, insulates the cell terminal, provides a hydrogen gas permeable diaphragm, a circuit opening actuator and a pressure frangible safety device.

3,617,387
BATTERY CONSTRUCTION HAVING CELL COMPONENTS COMPLETELY INTERNALLY BONDED WITH ADHESIVE

Carle Albert Grulke, Berea, and Thomas Arthur Reilly, Bay Village, both of Ohio, assignors to Union Carbide Corporation, New York, N.Y.

Filed Feb. 20, 1969, Ser. No. 800,854
Int. Cl. H01m *21/00*
U.S. Cl. 136—111 **12 Claims**



An electric current producing cell which is completely internally bonded and requires the use of no external supports is obtained by bonding individual cell components to each other with a polymeric adhesive which maintains physical and electrical contact between the components.

3,617,388
METHOD OF ACTIVATING FUEL CELL ANODES

Seigo Matsuda, Wayland; John J. O'Connell, Waltham, Mass., and Marshall C. Freerks, Kirkwood, Mo., assignors to Monsanto Research Corporation, St. Louis, Mo.

Filed July 25, 1966, Ser. No. 567,394
Int. Cl. H01m *13/00, 27/00*
U.S. Cl. 136—120 FC **2 Claims**

A novel fuel cell comprising a cathode, means to introduce an oxidizing agent to said cathode, an electrolyte separating said cathode from an anode comprising a conductive base material and a metal chelate as a catalytic component thereof and means to introduce a fuel to said anode.

3,617,389
PREPARATION OF RANEY CATALYST FUEL CELL ELECTRODES

Wolfgang Kuhn, Frankfurt am Main; Werner Lindner, Niederhochstadt, Taunus, and Gerd Sandstede, Frankfurt am Main, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed May 29, 1968, Ser. No. 732,819
Int. Cl. H01m *13/04*; B22f *3/24*
U.S. Cl. 136—120 FC **6 Claims**

In the preparation of Raney alloy fuel cell electrodes using polytetrafluoroethylene as a binder, harmful reaction of the binder with the aluminum or other reactive metal of the Raney alloy is prevented by the presence of finely powdered silver salts which envelop and protect the Raney alloy particles and develop a protecting gas at the sintering temperature of the polytetrafluoroethylene.

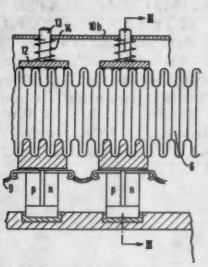
3,617,390
THERMOGENERATOR HAVING HEAT EXCHANGE ELONGATED FLEXIBLE METALLIC TUBE OF WAVY CORRUGATED CONSTRUCTION

Eugen Szabo De Bucs, Erlangen, and Josef Winkler, Nurnberg, both of Germany, assignors to Siemens Aktiengesellschaft, Berlin, Germany

Continuation of application Ser. No. 640,544, May 23, 1967, now abandoned. This application Oct. 1, 1969, Ser. No. 864,282
Int. Cl. F25b *21/02*; F28f *7/00*; H01v *1/30*
U.S. Cl. 136—211 **8 Claims**

A thermogenerator wherein a plurality of thermocouples are arranged with their high-temperature junctions situated

in one row and with their opposed low-temperature junctions situated in a second row. A pair of elongated heat-exchangers respectively extend along these rows and engage the thermocouples at the junctions thereof. At least one of these heat-exchangers is in the form of an elongated hollow tubular structure for conveying along its interior a liquid heat-



exchanging medium, and this one heat-exchanging structure has a plurality of rigid portions engaging the thermocouples and a plurality of intermediate flexible portions situated respectively between and operatively connected with the rigid portions. A spring means coacts with both of the heat-exchangers for urging them toward each other so as to maintain them pressing against the thermocouples.

3,617,391
METHOD FOR PRODUCING PASSIVATED PN-JUNCTIONS BY ION BEAM IMPLANTATION

Martin P. Lepselter, New Providence, N.J., and Herbert A. Waggener, Allentown, Pa., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.

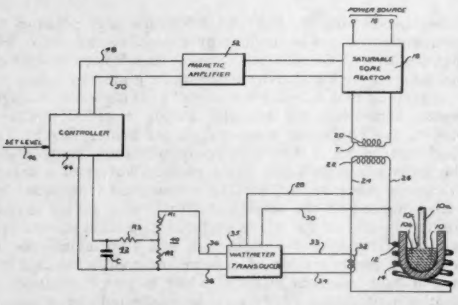
Filed Sept. 15, 1969, Ser. No. 857,859
Int. Cl. H01l *7/54*
U.S. Cl. 148—1.5 **9 Claims**

A method for producing tucked under, passivated PN-junctions in semiconductor devices by ion implantation through a layered mask. Apertures in the upper layers of the mask are formed somewhat larger than the corresponding apertures in a first layer (contiguous with the surface of the semiconductor) so that an annulus of uncovered first layer remains around each exposed portion of semiconductor surface. Then the structure is subjected to a beam of dopant ions of sufficient energy to pass through the exposed annulus of uncovered first layer but of insufficient energy to pass through the area covered by the multiple layers; and a tucked under, passivated junction thereby is formed.

3,617,392
POWER CONTROL FOR CRYSTAL GROWING

Richard Locke, Jr., New York, N.Y., assignor to Semimetals, Inc., Westbury, N.Y.

Filed Oct. 29, 1968, Ser. No. 771,491
Int. Cl. B01j *17/18*
U.S. Cl. 148—1.6 **14 Claims**



Apparatus and process for crystal growing by the Czochralski or similar processes in which the operator determines the amount of power to be furnished to the heating element for the crystal material, and in which the system automatically maintains said furnished power at said determined amount. In this way short-range disturbances in the heating process are compensated for, while long-range changes are taken care of by manual or automatic changes, from time to time, in the power level to be furnished. As a result, crystal diameter control is markedly improved on a production basis.

3,617,393
PRETREATMENT BEFORE ELECTROPHORETIC PAINTING

Tadamitsu Nakazawa, Kawasaki-shi; Makishima: Hiroshi, Yokohama-shi; Toshio Shinohara, Yokahama-shi, and Yukio Kawahara, Yokohama-shi, all of Japan, assignors to Dai Nippon Toryo Kabushiki Kaisha, Osaka, Japan

Filed Oct. 8, 1969, Ser. No. 864,874
Int. Cl. C23f *7/10*
U.S. Cl. 148—6.15 Z **4 Claims**

When a metal surface treating agent consisting of a zinc phosphate comprising given amounts of water-soluble aluminum, arsenic and fluorine compounds added thereto is employed as pretreatment before electrophoretic painting, the dissolving quantity of the phosphating coating is reduced, and it results in formation of a uniform electrodeposition-coated film which has excellent corrosion resistance and is free from rough surface; moreover, as the paint is not contaminated, the paint can be stable for a long time. Finish of the electrodeposition coating can be also improved by using pretreatment prepared by adding further a small amount of Te and/or Bi.

3,617,394
KILN PASSIVATION OF REDUCED ORES

Ivan Mayer, Summit, N.J., assignor to Esso Research and Engineering Company

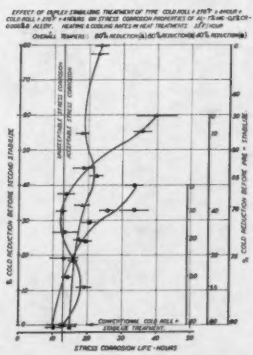
Filed Nov. 22, 1968, Ser. No. 778,308
Int. Cl. C23f *7/04;* **C21b** *1/00*
U.S. Cl. 148—6.35 **7 Claims**

A process is described for passivating active forms of finely divided metal particles by mildly oxidizing their surfaces at high temperatures in a rotating kiln.

3,617,395
METHOD OF WORKING ALUMINUM-MAGNESIUM ALLOYS TO CONFER SATISFACTORY STRESS CORROSION PROPERTIES

Francis P. Ford, Hamden, Conn., assignor to Olin Mathieson Chemical Corporation

Filed Apr. 9, 1969, Ser. No. 814,631
Int. Cl. C22f *1/04*
U.S. Cl. 148—11.5 A **5 Claims**



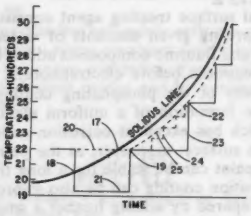
Providing an aluminum-magnesium alloy containing from 5.0 to 10.0 percent magnesium, heating said alloy to a temperature range of 650° to 800° F. for 1 to 16 hrs., cooling said alloy. heating said alloy to a temperature range from 225° to 375° F. for 15 mins. to 24 hrs., cooling said alloy to

ambient temperature, cold reducing said alloy to 5.0 to 95.0 percent reduction, heating said alloy to a temperature range to 225° to 375° F. for 15 mins. to 24 hrs., and cooling said alloy.

3,617,396
BRAZING MIXTURE FOR JOINING PARTS

Dan P. Duff, Grand Prairie, Tex., and Joseph A. Van Velzor, Columbus, Ohio, assignors to LTV Aerospace Corporation, Dallas, Tex.

Division of Ser. No. 551,824, Apr. 25, 1966, Pat. No. 3,496,630.
Filed Apr. 22, 1969, Ser. No. 842,041
Int. Cl. B22f *7/08*; C22c *1/04, 5/00*
U.S. Cl. 148—24 5 Claims

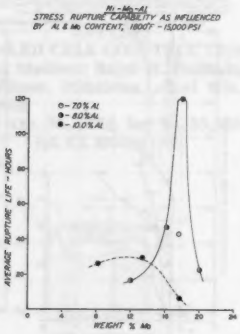


A brazing mixture which contains first and second types of metallic particles. The melting temperature of the first type of metallic particle in the mixture is lower than that of both the other type of metallic particle and the parts to be joined by the mixture. When the brazing mixture is heated to melt the first type of metallic particles, metallic particles of the second type diffuse into particles of the first type to form an alloy having a melting temperature higher than the melting temperature of the particles of the first type.

3,617,397
CAST NICKEL-BASE ALLOY

Douglas H. Maxwell, North Palm Beach, Fla., assignor to United Aircraft Corporation, East Hartford, Conn.

Filed Feb. 19, 1969, Ser. No. 800,591
Int. Cl. C22c *19/00*
U.S. Cl. 148—32.5 2 Claims

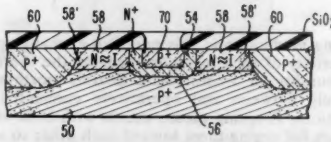

Ni-Mo-Al
STRESS RUPTURE CAPABILITY AS INFLUENCED BY Al & Mo CONTENT, 1800°F - 10,000 PSI
AVERAGE RUPTURE LIFE - HOURS
WEIGHT % Mo
○ - 7.0% Al
● - 8.0% Al
● - 10.0% Al

There is disclosed herein a cast nickel-base alloy having outstanding utility in gas turbine engine applications, particularly as directionally solidified, at a composition consisting essentially of, by weight, 17.5–18.5% molybdenum, 7.75–8.25% aluminum, up to 0.05% carbon, balance nickel.

3,617,398
A PROCESS FOR FABRICATING SEMICONDUCTOR DEVICES HAVING COMPENSATED BARRIER ZONES BETWEEN NP-JUNCTIONS

Orest Bilous, Beacon; Darrell R. Meulemans, Jerico; Raymond P. Pecorado, Wappingers Falls, N.Y., and Michael C. Selby, Burlington, Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 480,553, July 18, 1965, Pat. No. 3,473,093.
Filed Oct. 22, 1968, Ser. No. 798,511
Int. Cl. H011 *7/36, 5/00*; C23c *13/00*
U.S. Cl. 148—175 56 Claims

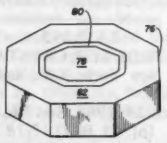


A process for forming semiconductor devices by forming in a semiconductor substrate of one conductivity type a diffused region of a second conductivity type circumscribed by an adjacent gold compensated intrinsic region.

3,617,399
METHOD OF FABRICATING SEMICONDUCTOR POWER DEVICES WITHIN HIGH RESISTIVITY ISOLATION RINGS

William L. Fowler, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 31, 1968, Ser. No. 772,154
Int. Cl. H011 *7/36*
U.S. Cl. 148—175 9 Claims



Improved performance characteristics are possible for semiconductor power devices by encircling the active elements with a high-resistivity isolation ring. Power devices encircled by a high-resistivity isolation ring may be fabricated by a method that includes the step of growing a bar of single-crystal semiconductor material having a radial resistivity varying in a controlled manner from the center thereof. This single crystal bar is then sliced perpendicularly transverse to the longitudinal axis into plane surface wafers of a desired thickness. After various surface preparation techniques, the active regions of the semiconductor power device may be formed in one of the plane surfaces at a desired resistivity section of the slice by photomask and etch techniques. By forming a center section of uniform resistivity encircled by a ring of high-resistivity material, which in turn is encircled by another uniform resistivity area, an integrated circuit may be fabricated on one slice of a single-crystal bar. In these circuits, the power devices would be isolated within the center region by means of the high-resistivity ring.

3,617,400
NITROCELLULOSE-BASED SOLID ROCKET PROPELLANT CONTAINING A CARBAMATE PLASTICIZER

Bernard B. Lampert, Carmichael, Calif., assignor to Aerojet-General Corporation, El Monte, Calif.

Continuation-in-part of application Ser. No. 693,690, Dec. 14, 1967, now Patent No. 3,429,755. This application May 21, 1968, Ser. No. 731,691
Int. Cl. C06b *19/00*
U.S. Cl. 149—2 **9 Claims**

This patent describes novel nitrocellulose-containing propellants containing at least one carbamate plasticizer selected from the group consisting of 2-nitratoethyl-N-methyl-N-nitrocarbamate, and 2-nitratoethyl-N-nitratoethyl-N-nitrocarbamate to provide propellant curing at ambient or slightly elevated temperatures.

3,617,401
COLUMN OF BLASTING AGENT OF CONTROLLED DENSITY

Kay S. Mortensen, and Lex L. Udy, both of Salt Lake City, Utah, assignors to Intermountain Research and Engineering Company

Filed Oct. 1, 1968, Ser. No. 764,195
Int. Cl. C06b *19/00*
U.S. Cl. 149—2 **9 Claims**

In order to control slurry density in deep holes, varying amounts of aerating or gasifying agent, preferably a generated essentially insoluble gas, are added. Hydrogen peroxide may be decomposed to produce oxygen, using catalyst such as potassium iodide or manganese dioxide, etc. Gas generating material and catalyst may be added variably, e.g. to produce gas in progressively decreasing proportions as slurry is pumped, starting at the bottom and rising in a borehole, to offset the compressive effect of the column weight thus keeping the whole slurry column at density low enough for reliable detonation.

3,617,402
AQUEOUS SLURRY BLASTING COMPOSITION CONTAINING AN ALIPHATIC AMINE SALT AND A WATER SOLUBLE INORGANIC PERCHLORATE

Herbert G. Knight, Jr., Flanders, N.J., assignor to Hercules Incorporated, Wilmington, Del.

Filed Dec. 24, 1968, Ser. No. 786,686
Int. Cl. C06b *19/00*
U.S. Cl. 149—2 **20 Claims**

The invention provides inorganic oxidizer salt blasting compositions of the aqueous slurry type containing a combination of an aliphatic amine salt and a water-soluble inorganic perchlorate as a sensitizer component. Preferably, each of said amine salt and perchlorate is present in the sensitizer combination in a proportion at least stoichiometrically equivalent to that required for reaction with the other to form a corresponding amine perchlorate as at lest 3 weight percent of the composition. Often, the proportion of each ingredient of the sensitizer combination is at least 2, and generally up to 25, weight percent of the composition.

3,617,403
IGNITION TRANSFER COMPOSITION COMPRISING FUEL, OXIDIZER AND FLUOROELASTOMER

Duane M. Johnson, Bicknell, Ind.

Filed Apr. 24, 1969, Ser. No. 819,523
Int. Cl. C06d *5/00*
U.S. Cl. 149—19 **2 Claims**

A transfer composition for igniting a pyrotechnic composition comprised of a fuel such as boron, an oxidizer, such as lead dioxide, and a fluoroelastomer which serves as a binder and desensitizer.

3,617,404
SLURRYXPLOSIVES CONTAINING THE COMBINATION OF NITROGEN-BASE SALT AND HARD SOLID PARTICLES AS SENSITIZER

William M. Lyerly, Hagerstown, Md., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 14, 1969, Ser. No. 836,676
Int. Cl. C06c *19/04*
U.S. Cl. 149—29 **15 Claims**

A water-bearing slurry explosive containing inorganic oxidizing salt, fuel, water and thickener together with nitrogen-base salt and solid particles having a hardness of at least 4 on the Mohs scale and that have an acoustic impedance at least two times that of the matrix of the slurry explosive.

3,617,405
INCENDIARY COMPOSITION CONTAINING A METAL, METAL ALLOY, OXIDIZER SALT, AND NITRATED ORGANIC COMPOUND

Thomas Stevenson, Huntingdon Valley, Pa., assignor to The United States of America as represented by the Secretary of the Army

Continuation-in-part of application Ser. No. 736,932, May 21, 1958, now Patent No. 2,951,752. This application Feb. 3, 1960, Ser. No. 6,573
Int. Cl. C06b *9/00*
U.S. Cl. 149—39 **3 Claims**

In an incendiary composition consisting essentially of about 50 percent by weight of metal powder from the class consisting of zirconium, titanium, and uranium in a particle size of 20 to 60 mesh, about 22½ percent by weight of 50–50 alloy of magnesium and aluminum, and about 22½ percent by weight of an oxidizer from the class consisting of barium nitrate and potassium perchlorate, the combination therewith of the improvement enabling said composition to retain impact sensitivity under elevated temperature storage for a longer period of time, and to process a longer duration of burning, said improvement consisting essentially of about 5 percent by weight of an explosive from the class consisting of trinitrotoluene (TNT), pentaerythritol tetranitrate (PETN), and cyclotrimethylene trinitramine (RDX), whereby such composition is adapted for embodiment in small caliber projectiles containing no fuze to retain its impact sensitivity against a thin aluminum sheet.

3,617,406
HYDROCARBON OIL-CONTAINING GELLED AQUEOUS INORGANIC OXIDIZER SALT EXPLOSIVES HAVING IMPROVED STABILITY TO SYNERESIS

Herbert L. Young, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed July 22, 1969, Ser. No. 843,805
Int. Cl. C06b *11/00*
U.S. Cl. 149—41 **16 Claims**

Process is provided for manufacture of a gelled aqueous hydrocarbon oil-containing inorganic oxidizer salt explosive having unexpectedly high stability to syneresis, which comprises admixing the hydrocarbon oil with the remaining ingredients of the explosive, as a separate oil-in-water emulsion, maintained by a defined emulsifying agent of the polyoxyethylene type, when the gelation agent is a cross-linkable galactomannan gum and is present in an amount of 1 to 3 weight percent of the finished explosive in a weight ratio to a cross linking agent therefor, preferably potassium pyroantimonate, of 30:1 to 70:1.

It is a combination of (1) use of the defined emulsifier, (2) the specific range of cross linking density (by proportions of the galactomannan gum and cross linking agent) and (3) the separate addition of the "preformed" emulsion, that provides the unexpected stability property.

Product by process is also provided.

3,617,407

AQUEOUS SLURRY EXPLOSIVE CONTAINING A THICKENER OF CROSS-LINKED GALACTOMANNAN WITH PSYLLIUM FLOUR

Joseph Francis McLean Craig, Beooeil, Quebec, and Errol Linton Falconer, Monta-Saint-Hilaire, Quebec, both of Canada, assignors to Canadian Industries Limited, Montreal, Quebec, Canada

Filed Sept. 15, 1969, Ser. No. 858,143
Claims priority, application Canada, Oct. 7, 1968, 031883
Int. Cl. C06b *15/00*
U.S. Cl. 149—44 7 Claims

A thickening agent for an aqueous slurry explosive composition comprises the combination of a cross-linked galactomannan with psyllium flour in specific proportions, which thickener provides good fluidity and reduced tackiness.

3,617,408

ZIRCONIUM SALT ANTICAKING INGREDIENT FOR NITRATES

Roger D. Hunter, and William L. Ripley, both of Bedford, Ind.

Filed Aug. 1, 1969, Ser. No. 846,944
Int. Cl. C06b *1/04*
U.S. Cl. 149—46 3 Claims

Quadrivalent zirconium is added in small proportions to nitrates, such as sodium nitrate and ammonium nitrate, to prevent caking. A solution of a soluble quadrivalent zirconium salt is added to a nitrate and the quadrivalent zirconium modifies the resultant crystal lattice of the nitrate upon drying to prevent caking of the nitrate during storage.

3,617,409

NITROCELLULOSE-NITROGLYCERINE EXPLOSIVE WITH ETHYLENE OXIDE

Gwyn Harries, Ripponlea, Victoria, Australia, assignor to Imperial Chemical Industries of Australia and New Zealand Limited, Melbourne, Victoria, Australia

Filed Aug. 15, 1969, Ser. No. 850,652
Claims priority, application Australia, Sept. 6, 1968, 43045
Int. Cl. C06b *1/04*
U.S. Cl. 149—48 8 Claims

Gelatinized explosive compositions comprising at least one liquid explosive nitric ester; nitrocellulose; at least one inorganic oxidizing agent; at least one carbonaceous combustible material; at least one condensation product of a lower alkylene oxide with a compound selected from the group consisting of alkyl phenols, long chain alcohols, long chain carboxylic acids, long chain amines, amides of long chain carboxylic acids and alkylolamides of long chain carboxylic acids, and optionally water.

3,617,410

PRESSURE-SENSITIVE RECORDING SHEET AND METHOD OF MAKING

Kenneth H. Clark, Waverly, Ohio, assignor to The Mead Corporation, Dayton, Ohio

Filed May 1, 1969, Ser. No. 821,086
Int. Cl. B41m *5/22*
U.S. Cl. 117—36.2 11 Claims

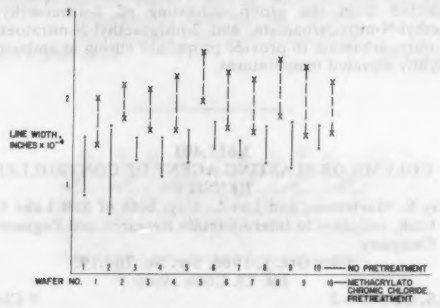
Record sheets having improved resistance to smudging and calender intensity for use with transfer sheets containing microscopic rupturable capsules of a colorless marking fluid are produced by coating a base sheet with a composition comprising a finely powdered oil-soluble acid-reactant polymeric material, a substantially nonreactant pigment having a relative sediment volume (RSV) in excess of 2 and a binder for said polymeric material and pigment.

3,617,411

PROCESS FOR ETCHING A PATTERN OF CLOSELY SPACED CONDUCTING LINES IN AN INTEGRATED CIRCUIT

Roger A. Couture, Richmond; John J. Lajza, Jr., Williston, and William E. Wright, Shelburne, all of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 14, 1969, Ser. No. 791,043
Int. Cl. C23b *3/00*; C23f *1/02*, *7/26*
U.S. Cl. 156—8 8 Claims



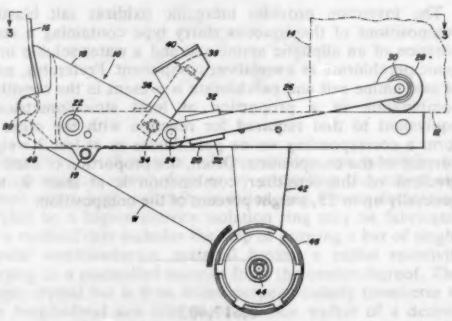
Very small patterns may be etched in aluminum or other metal surfaces using photoresist to mask areas of the surfaces where etching is not desired by applying a Werner complex of chromium with a carboxylic acid to the metal surface. The process is particularly useful for etching conducting lines in microminiature semiconductor device fabrication because the chromium complex increases the adhesion of the photoresist to the aluminum sufficiently to improve line resolution in subsequent etching, and does not increase bridging between adjacent conducting lines.

3,617,412

FLAT CURL-FREE U-SEALING ADHESIVE TAPE APPLYING MACHINE

Dick W. Schenderling, Maassluis, and Dingeman Bijl, Rotterdam, both of Netherlands, assignors to GAF Corporation, New York, N.Y.

Filed Dec. 22, 1967, Ser. No. 692,843
Int. Cl. B32b *31/18*
U.S. Cl. 156—461 5 Claims



This invention relates to a tape-applying machine and, in particular, to an improved U-sealer for cuboid objects or cartons. The apparatus or U-sealer includes a tape-applying member and a presser roller adapted to apply pressure-sensitive adhesive tape to a carton conveyed along a linear path. The tape-applying member is retractably interposed in the travel path of the carton and includes an upstanding end portion of the adhesive tape in an unsupported condition. This

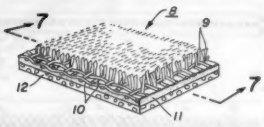
physical characteristic is imparted to the tape by cooperative grooving rollers which provide a longitudinal stiffening ridge or groove in the tape prior to application to the carton.

3,617,413

PRODUCTION OF SIMULATED GRASSLIKE PRODUCTS

Donald L. Elbert, Gulf Breeze, Fla., assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 700,096, Jan. 24, 1968, Pat. No. 3,573,147.
Filed June 26, 1970, Ser. No. 50,275
Int. Cl. B44c *5/06*
U.S. Cl. 156—61 4 Claims



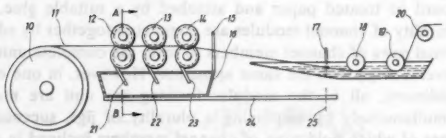
Random discontinuous slits cut in monofilament ribbons before weaving, knitting, tufting, or otherwise binding provide in a finished synthetic turf product, random variable blade widths with physical characteristics and appearance similar to that of natural grass.

3,617,414

PROCESS AND APPARATUS FOR THE MANUFACTURE OF FIBER GLASS REINFORCED PLASTIC TUBES AND SIMILAR BODIES ACCORDING TO THE FILAMENT WINDING PROCESS

Ludwig Wesch, Heidelberg, Germany, assignor to Mancar-Trust, Vaduz, Liechtenstein

Filed Aug. 9, 1966, Ser. No. 571,293
Claims priority, application Germany, Aug. 10, 1965, W 39 707
Int. Cl. B31c *13/00*; B65h *81/08*
U.S. Cl. 156—169 4 Claims



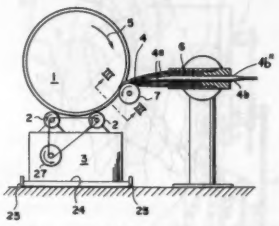
A process and apparatus for manufacturing tubes from coils of fiber glass which have been impregnated in a suitable resin. The fiber glass initially is in the form of roving strands which are guided through a suitable impregnating bath. Suitable combs guide the rovings between pressure rollers which have a configuration imparting to the rovings a flat band shape, giving the rovings a rectangular cross section. Not only are the rovings thus provided with a rectangular cross section and a flat tapelike configuration, but in addition the pressure rollers serve to maintain the rovings at a distance from each other which is substantially less than their width, the distance between the flat rovings being much less than one-half of their width and in some cases as small as one-tenth their width. In this condition the rovings are angularly fed onto a rotary mandrel on which the coils are formed so as to provide the desired tube. Because of the small distance between the flat rovings an exceedingly strong tube with a high burst strength is achieved.

3,617,415

METHOD OF MAKING HOLLOW REINFORCED BODIES

Manfred Hawerkamp, Altenrather Str. 47, Troisdorf, Germany

Continuation-in-part of application Ser. No. 516,945, Dec. 28, 1965, now abandoned. This application Apr. 23, 1969, Ser. No. 818,521
Int. Cl. B31c *13/00*
U.S. Cl. 156—172 8 Claims



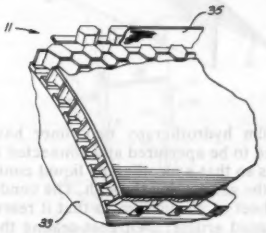
Method of making a hollow reinforced body comprising a plurality of helically wound generally flattened turns of a continuous thermoplastic band with each turn overlying a preceding turn by about one-half the width of the band and being overlapped by the next succeeding turn by about one-half the width of the band, the turns being bonded together under heat and pressure. The band includes a transversely stepped continuous metal reinforcing strip embedded therein and underlying the overlapping portion of the next succeeding turn and the strip thereof while overlying the strip of the next turn.

3,617,416

HONEYCOMB STRUCTURES

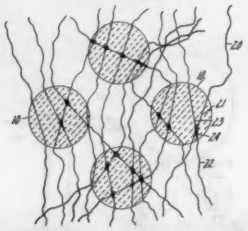
Robert V. Kromrey, Placerville, Calif., assignor to Aerojet-General Corporation, El Monte, Calif.

Filed June 23, 1967, Ser. No. 648,447
Int. Cl. B31c *13/00*
U.S. Cl. 156—173 17 Claims



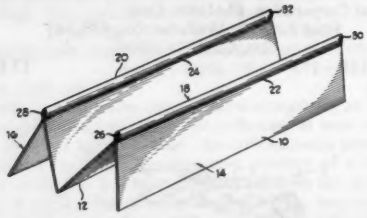
A method and resultant structure consisting of fiber-reinforced honeycomb that is integrally molded to a substrate material wherein the honeycomb is formed of fibers wrapped about dies having the configuration of the desired cells. The fibers utilized may form the actual substrate for the honeycomb in one embodiment, while in another embodiment of the invention a separate substrate is bonded to macerated fibers comprising the cellular walls. The molds are left in the formed structure during the solidification thereof, and can be permanently left in the cells when so desired or removed after formation of the final integrated item.

3,617,417
PROCESS FOR FORMING A BONDED NONWOVEN FABRIC
Arthur R. Olson, Walpole, Mass., assignor to The Kendall Company, Boston, Mass.
Division of Ser. No. 476,870, Aug. 3, 1965.
Filed Apr. 25, 1969, Ser. No. 839,116
Int. Cl. D04h 3/03
U.S. Cl. 156—181 2 Claims



A spot-bonded nonwoven fabric is made by supporting a web of textile-length fibers composed at least in part of thermoretractile fibers on a porous surface such as a screen. On the other surface of the web there is applied a screening member bearing a pattern of apertures, and a stream of heated gas is directed through the screening member and the web, to produce a spot-bonded nonwoven fabric wherein the fibers lying underneath the apertures are bonded to each other and are in a tensioned rectilinear configuration.

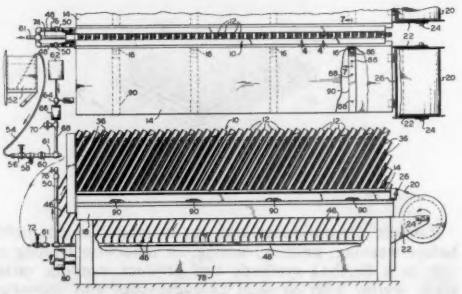
3,617,418
METHOD OF MAKING A HYDROTHERAPY TANK LINER
Robert C. Miller, Elgin, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.
Filed Feb. 18, 1970, Ser. No. 12,311
Int. Cl. B31f 7/00
U.S. Cl. 156—227 1 Claim



A plastic film hydrotherapy tank liner having conduits therein adapted to be apertured and connected to a source of pressurized gas so that hydrotherapy liquid contained therein is agitated by the gas passing through. The conduits are made by folding a sheet of plastic film so that it resembles, in section, an M-shaped article, then heat sealing the two spaced folds of the folded sheet to provide the conduits, one terminal end of each being then closed by heat sealing.

3,617,419
ADHESIVE AND METHOD FOR BONDING CROSS LINKED POLYOLEFINS AND OTHER POLYMERIC MATERIAL
Joseph Fischer, Urbana, and Thomas E. Haddock, Atwood, both of Ill., assignors to National Distillers and Chemical Corporation, New York, N.Y.
Filed Feb. 6, 1969, Ser. No. 797,266
Int. Cl. B32b 27/08; C09j 3/14
U.S. Cl. 156—332 4 Claims
An adhesive comprising an ethylene-vinyl acetate copolymer, an organic solvent and a cross-linking agent and a method of bonding comprising coating at least one surface to be bonded, contacting the surfaces under pressure and heating.

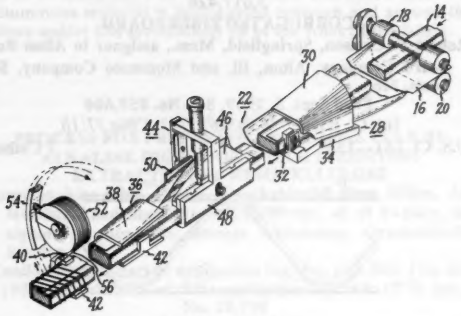
3,617,420
APPARATUS FOR MAKING MULTIPLE CHANNEL LIQUID TREATING UNIT
Curtis E. McCann, Corvallis, Oreg., assignor to Neptune Microfloc, Incorporated, Corvallis, Oreg.
Filed Nov. 18, 1968, Ser. No. 776,648
Int. Cl. B32b 31/20; B30b 15/34
U.S. Cl. 156—382 20 Claims



Apparatus is described for manufacturing a liquid treating unit including a plurality of rows of parallel channel members secured between sidewall members with successive rows inclined in opposite directions and separated by a sidewall member. The apparatus includes a jig for supporting the channel members of one row and a pair of support plates pivotally mounted on opposite sides of the jig for supporting a pair of sidewall members to enable attachment thereof to the side edges of such channel members and formation of a channel module. Air pressure instead may be employed for supporting the sidewall members in engagement with the channel members. The members may be of plastic material and are attached together by a solvent sprayed from nozzles attached to the jig or by thermal fusion with electrical heating strips. However it is also possible to use members of cardboard or treated paper and attached by a suitable glue. A plurality of channel modules are connected together by additional rows of channel members to form the complete unit in several steps with the same apparatus. However, in one embodiment, all of the modules forming the unit are made simultaneously by employing a plurality of jigs, successive ones of which hold rows of channel members inclined in opposite directions and are mounted on two jig supports that are moved relative to each other to enable removal of the completed unit.

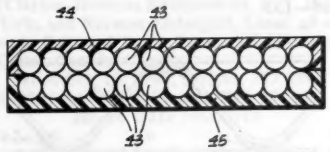
3,617,421
DEVICE FOR FOLDING INSULATING TAPE ABOUT ELECTRICAL CONDUCTORS
Willard F. M. Gray, Hancock, and George C. Lovejoy, Pittsfield, both of Mass., assignors to General Electric Company
Filed Nov. 14, 1966, Ser. No. 594,097
Int. Cl. H01b 13/26
U.S. Cl. 156—438 2 Claims
A device for wrapping insulating tape longitudinally on electrical wire. The electrical wire and insulating tape will lead together with the wire on top of the tape into a first folding shoe. The first folding shoe folds one side of the tape about one side of the wire. A creasing member creases the tape tightly to the one side of the wire. A second folding shoe is provided beyond the first folding shoe, such second folding shoe folding the other side of the tape about the other side of

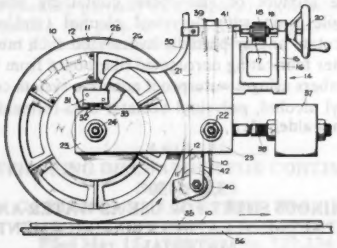
the wire. A second creasing member creases the tape tightly to such other side of the wire. A strand of yarn is wrapped



about the folded and creased tape holding such tape securely to the wire.

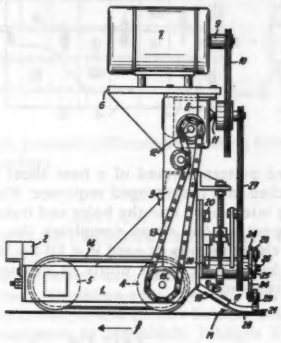
3,617,422
TAPE APPLICATOR
John Rene Paulson, Lachute, Quebec, Canada, assignor to Sesame Industries Limited, Montreal, Quebec, Canada
Filed Dec. 4, 1968, Ser. No. 782,792
Claims priority, application Canada, May 10, 1968, 19,687
Int. Cl. B32b *31/00*
U.S. Cl. 156—552 **3 Claims**





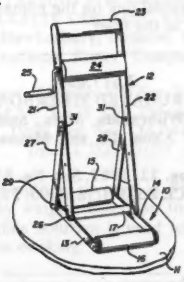
The invention relates to a tape applicator for a tape of the type having one side of adhesive material and the other side of heat stable material. The applicator comprises a roller, heating means in the roller for heating the roller surface, and means for applying the heat stable surface of the tape upon the surface of the roller. The roller is mounted on an arm pivotally mounted in a frame which is slidably mounted. The roller rests upon a sheet supporting surface and a counterweight is connected to the arm for adjusting the pressure of the roller upon the sheet.

3,617,423
APPARATUS FOR LAYING COATING OF RESINOUS MATERIAL
Ralph Agthe, Nyon, Vaud, and Charles Merminod, Meyrin, Geneva, both of Switzerland, assignors to Societe Anonyme Conrad Zschokke, Geneva, Switzerland
Filed May 17, 1967, Ser. No. 643,788
Claims priority, application Switzerland, June 2, 1966, 8001/66
Int. Cl. B05c *11/02;* **E01c** *19/40*
U.S. Cl. 156—575 **6 Claims**



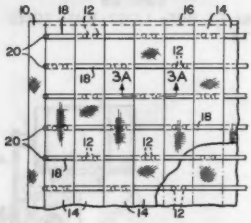
A driven frame carries a spreading arrangement between portions of which viscous synthetic resin-containing material is placed onto a surface over which the frame travels. A spring steel sheet resiliently bears upon the upper side of the material and smoothes the same onto the surface. A vibrating arrangement vibrates the sheet for compacting the material.

3,617,424
TAPE APPLICATOR AND REMOVAL APPARATUS
Robert C. Smith, 823 Clay St., Wray, Colo.
Filed Jan. 7, 1969, Ser. No. 789,590
Int. Cl. B32b *31/10, 31/20*
U.S. Cl. 156—577 **9 Claims**



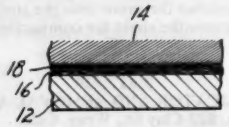
A tape apparatus has two operating positions, one for applying and one for removing a heavy-duty, relatively wide pressure-sensitive adhesive tape. This apparatus has a base section having rollers for rolling movement over a surface and an upright tape support section hinged at its lower end on the base section and held at one of two inclined positions to automatically unwind a tape roll and apply it to the surface when moved in one direction and to remove and roll the tape on a tape mandrel for reapplication when required when moved in the opposite direction.

3,617,425
LACED PATTERN
Marna White, 2529 Siesta Court, Tampa, Fla.
Filed Oct. 27, 1969, Ser. No. 869,522
Int. Cl. B32b 3/10, 3/16
U.S. Cl. 161—38 6 Claims



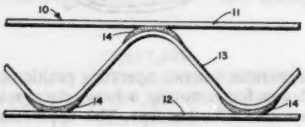
A laced pattern formed of a base sheet into which holes are punched in a prearranged sequence. Flexible strips fixed by lacing interwoven into the holes and transversely arranged with respect to the strips completes the pattern. The individual elements may be used in a kit for handicraft and the finished laced pattern has utility as wearing apparel or any decorative panel.

3,617,426
TORQUE-TRANSMITTING MEMBER
Roger V. Grundman, Roseville, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Filed Mar. 10, 1969, Ser. No. 805,422
Int. Cl. F16d 3/00
U.S. Cl. 161—42 6 Claims



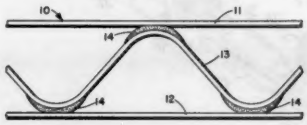
A torque-transmitting member in which a plurality of short stiff normally straight fibers are secured to and randomly spaced on a planar surface of a flexible backing. Each fiber has one end secured to the planar surface and extends therefrom at an acute angle less than about 45° and generally perpendicular to a radial line on the planar surface intersecting the secured end of the fiber.

3,617,427
CORRUGATED FIBERBOARD
John R. Le Blanc, Wilbraham, Mass., assignor to Alton Box Board Company, Alton, Ill. and Monsanto Company, St. Louis, Mo.
Filed Aug. 22, 1969, Ser. No. 852,396
Int. Cl. B32b 3/38, 9/06, 29/06
U.S. Cl. 161—133 5 Claims



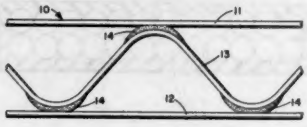
Corrugated fiberboard which resists deterioration in strength when in the presence of moisture or water, and intermediate resin treated medium and liner sheet members useful in the manufacture thereof. Such board is made by treating medium and, optionally, liner members with an aminoplast modified phenol aldehyde resole resin composition and thereafter bonding corrugated medium to liner members with a thermosetting waterproof adhesive system.

3,617,428
CORRUGATED FIBERBOARD
Robert P. Carlson, Springfield, Mass., assignor to Alton Box Board Company, Alton, Ill. and Monsanto Company, St. Louis, Mo.
Filed Sept. 5, 1969, Ser. No. 855,666
Int. Cl. B32b 3/28; B32b 27/42; C08g 37/18
U.S. Cl. 161—133 7 Claims



Corrugated fiberboard which resists deterioration in strength when in the presence of moisture or water. Such board is made by treating medium and, optionally, liner members with an aminoplast containing phenol-aldehyde resole resin composition and thereafter bonding corrugated medium to liner members with a thermoplastic waterproof adhesive system containing substantially fully hydrolyzed polyvinyl alcohol.

3,617,429
CORRUGATED FIBERBOARD
John R. Le Blanc, Wilbraham, Mass., assignor to Alton Box Board Company, Alton, Ill. and Monsanto Company, St. Louis, Mo.
Filed Sept. 26, 1969, Ser. No. 861,272
Int. Cl. B32b 3/28, 27/42; C08g 37/18
U.S. Cl. 161—133 10 Claims



Corrugated fiberboard which resists deterioration in strength when in the presence of moisture or water, and which has improved folding endurance. Such board is made by preliminarily treating medium and, optionally, liner members with a mixture of aminoplast containing phenol-aldehyde resole resin with polyvinyl alcohol (and/or with polyvinyl acetate and/or partially hydrolyzed such mixtures) and thereafter fabricating corrugated fiberboard from the so-treated members using a waterproof adhesive system containing polyvinyl alcohol, polyvinyl acetate, urea-formaldehyde, and/or phenol-aldehyde.

3,617,430
BITUMINOUS SHEET FOR USE AS WATER AND DAMPNESS-INSULATING REINFORCEMENT MATERIAL
Eiichi Tajima, 15, 4-Chome, Komagome, Toshima-ku, and Kaname Yamamoto, 3-5, 6-Chome, Nishiogu, Arakawa-ku, both of Japan
Continuation-in-part of application Ser. No. 558,121, June 16, 1966, now Patent No. 3,403,425. This application June 21, 1968, Ser. No. 738,806 Claim priority, application Japan, Dec. 26, 1967, 42/83827
Int. Cl. B32b 5/06, 11/00
U.S. Cl. 161—151 3 Claims

A bituminous sheet for use as a water- and dampness-insulating reinforcement material for various types of construc-

tions. The sheet is comprised of a nonwoven web of randomly arranged irregularly overlying straight synthetic staple fibers having an average length of at least 50 mm. and having a fineness measurement ranging from one-half to 20 denier. A binder material fixes the fibers with respect to one another so as to make the web into a matlike, nonwoven fabric. A bituminous material is interspersed between and around the fibers and/or fills substantially all of the voids of the fabric.

3,617,431

PROCESS FOR PREPARING CELLULOSE PULP BY ALKALINE DIGESTION WHILE INHIBITING EXTRACTION OF HEMICELLULOSE

Ingemar Liss-Albin Croon, Ornskoldsvik; Sten Dillen, Alfredshem, and Sture Noreus, Sundasen, all of Sweden, assignors to Mo och Domsjo Aktiebolag, Ornskoldsvik, Sweden

Continuation-in-part of application Ser. No. 618,360, Feb. 24, 1967, now abandoned. This application Apr. 15, 1970, Ser. No. 28,790

Int. Cl. D21c *3/26*

U.S. Cl. 162—17 **16 Claims**

A process is provided for preparing cellulose pulp by the alkaline digestion of lignocellulosic material while inhibiting extraction of hemicellulose by employing an alkaline cooking liquor having a high concentration of substantially nondegraded hemicellulose having a degree of polymerization of at least 80. The cellulose pulp product thus contains within its fibers much or substantially all of the hemicellulose present in the natural lignocellulosic material.

3,617,432

DELIGNIFYING LIGNOCELLULOSE WITH AN INCOMPLETE SODA COOK FOLLOWED BY GASEOUS BLEACHING

David W. Clayton, Hudson; Raimbault M. A. T. De Montigny, Baie D'Urfe, and Norman Liebergott, Laval, all of Canada, assignors to Pulp and Paper Research Institute of Canada, Pointe Claire, Quebec, Canada

Filed Oct. 15, 1968, Ser. No. 767,829

Claims priority, application Canada, Dec. 15, 1967, 007,696

Int. Cl. D21c *3/02, 3/18*

U.S. Cl. 162—19 **18 Claims**

A process is provided for the preparation of pulp from lignocellulosic material. It involves two essential steps, namely: firstly, carrying out a modified conventional soda-cooking step in which the cooking conditions are deliberately selected to be such that the yield is significantly higher than that normally corresponding to a bleachable pulp and in which the material is simultaneously at least partially defiberized; and secondly, either partially or completely delignifying the pulp by subjecting the pulp so produced to a gaseous bleaching treatment while it is in defiberized form.

3,617,433

DEFIBERING DISCHARGER FOR CONTINUOUS DIGESTERS

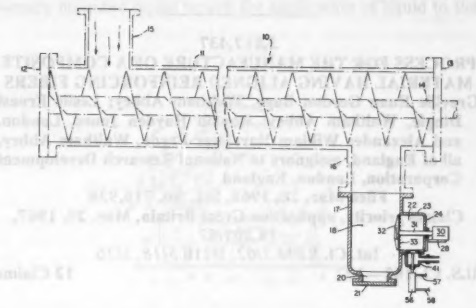
Douglas G. Sutherland, 1512 N. Briel Blvd., Middletown, Ohio

Filed May 15, 1968, Ser. No. 729,334

Int. Cl. D21b *1/36;* **D21c** *7/08*

U.S. Cl. 162—21 **7 Claims**

Fibrous material is discharged from a digester into a discharger tank which has a perforated plate in one of its walls for discharging the fibrous material into a first exit chamber. From the first exit chamber, the fibrous material passes through a restricted passageway defined by a frustoconical shaped bore and a selectively movable frustoconical shaped plug into a second exit chamber. A rotor, located in the discharger tank adjacent the perforated plate, wipes oversized chips and fibrous bundles from the perforated plate. The holes of the perforated plate are tapered outwardly towards the first exit chamber to prevent clogging thereof. The fibrous material is simultaneously



defibered by steam pressure differentials existing between the tank and exit chambers.

3,617,434

REGENERATION OF COOKING CHEMICALS FROM SPENT ALKALINE COOKING LIQUOR

Tadashi Nakafuri, Hiroshima-ken; Saburo Fukui, Hiroshima-ken; Masao Ono, Hiroshima-ken; Kyoichi Oku, Tokyo; Hiroshi Matsuura, Tokyo, and Hitoshi Sotobayashi, Tokyo, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha and Jujo Paper Co., Ltd., Tokyo, Japan

Filed May 28, 1968, Ser. No. 732,657

Claims priority, application Japan, May 31, 1967, 42/34754

Int. Cl. D21c *11/12*

U.S. Cl. 162—30 **4 Claims**

A process for recovering useful chemicals from spent alkaline cooking liquor of high sulfide content produced in the course of wood pulp manufacture. The spent cooking liquor is concentrated and the concentrate burned in a recovery furnace to produce a smelt comprising mainly Na_2CO_3 and Na_2S. Part or all of the Na_2CO_3 is separated from the smelt and reacted with SO_2 from the recovery furnace flue gases and, if desired, SO_2 from another source to produce Na_2SO_3. The Na_2SO_3 is burned in the recovery furnace with the concentrated cooking liquor where said Na_2SO_3 is converted to Na_2S. The resultant smelt has a high sulfide content and, when it is dissolved in water, an alkaline cooking liquor of high-sulfide content is regenerated.

3,617,435

TREATMENT OF WOODPULP WITH AN ALKALINE SOLUTION CONTAINING FORMALDEHYDE PRIOR TO A BISULFITE COOKING THEREOF

John H. Kalisch, Hawkesbury, Ontario, Canada, assignor to Canadian International Paper Company, Montreal, Ontario, Canada

Continuation-in-part of application Ser. No. 539,683, Apr. 4, 1966, now Patent No. 3,479,249. This application June 3, 1968, Ser. No. 734,044

Int. Cl. D21c *3/20*

U.S. Cl. 162—72 **8 Claims**

A bisulfite wood-pulping process in which not more than about 2 percent by weight, based on the wood, of formaldehyde in an alkaline solution is used to pretreat the wood prior to the bisulfite cooking.

3,617,436

PROCESS FOR CONTROLLING CHRYSOSPORIUM LIGNORUM IN LIGNOCELLULOSIC MATERIAL

Anders Assarsson, Sundasen, and Thomas Nilsson, Skarholmen, both of Sweden, assignors to Mo och Domsjo Aktiebolag, Ornskoldsvik, Sweden

Filed July 11, 1968, Ser. No. 743,964

Claims priority, application Sweden, July 18, 1967, 10,067/1967

Int. Cl. D21c *3/20*

U.S. Cl. 162—72 **18 Claims**

A process is provided for the selective control of Chrysosporium lignorum in wood chip piles that are stored in

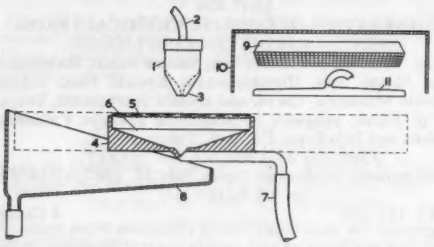
the open for long periods of time, by means of a nickel compound, without deleterious effect on the microbiological activity of other nonharmful organisms.

3,617,437

PROCESS FOR THE MANUFACTURE OF A COMPOSITE MATERIAL HAVING ALIGNED REINFORCING FIBERS

Greville Euan Gordon Bagg, Waltham Abbey; Leslie Ernest Dingle, Waltham Abbey; Ronald Hayden Jones, London, and Alexander William Harrower Pryde, Waltham Abbey, all of England, assignors to National Research Development Corporation, London, England

Filed Mar. 28, 1968, Ser. No. 716,938
Claims priority, application Great Britain, Mar. 29, 1967, 14,201/67
Int. Cl. B29d *3/02*; D21h *5/18, 5/26*
U.S. Cl. 162—102 12 Claims



A process for the manufacture of a composite material comprising a matrix containing aligned reinforcing fibers includes the steps of dispersing the fibers in a viscous liquid, passing the dispersion through an orifice so that the fibers are at least partially aligned, and laying the dispersion containing aligned fibers upon a permeable surface moving relative to the orifice at a velocity at least that at which the fiber dispersion leaves the orifice and withdrawing the viscous liquid through the permeable surface by suction sufficiently rapidly for the alignment of the fibers thereon to be maintained.

3,617,438

ELECTRIC INSULATING PAPER AND ITS PRODUCTION PROCESS

Osakazu Nakao; Juichi Hirose; Toshio Nakamura; Hiroyuki Yamamoto; Shinji Matsuda, and Hidetaro Suzuki, all of Shizuoka, Japan, assignors to Tomoegawa Paper Manufacturing Co., Ltd., Tokyo, Japan

Filed Feb. 12, 1970, Ser. No. 11,019
Claims priority, application Japan, Feb. 12, 1969, 10246/1969
Int. Cl. D21h *3/02, 5/12*
U.S. Cl. 162—138 14 Claims

A process for the production of an electric insulating paper and the insulating paper thus produced, having superior characteristics such as a low dielectric constant, a low dielectric loss tangent, and a high dielectric strength, is disclosed. The process comprises the steps of preparing a graft-cellulose solution, or a mixed solution or suspension consisting of a synthetic polymer mixed into a cellulose solution or a graft-cellulose solution, solidifying the solution, mixed solution, or suspension into a regenerating substance such as air or a precipitant, forming the regenerated substance thus solidified into a pulplike substance adapted to be fabricated into a paper, and forming the pulplike substance only or the pulplike substance mixed with the ordinary beaten pulp into an insulating paper.

3,617,439

PROCESS FOR IMPROVING COMMINUTION PULP SHEETS AND RESULTING AIR-LAID ABSORBENT PRODUCTS

Benjamin E. Chapman, Jr., Memphis, Tenn., assignor to The Buckeye Cellulose Corporation, Cincinnati, Ohio

Filed Jan. 2, 1969, Ser. No. 789,084
Int. Cl. D21d *3/00*
U.S. Cl. 162—158 9 Claims

A method for producing comminution pulp sheets from cellulosic fibers and the products resulting therefrom as pulp sheets and air-laid absorbent batts, which method comprises impregnating the fibers of the comminution pulp sheets with about 0.1 to 2 percent of a selected zwitterionic surfactant, such as N-octadecyl -N, N- dimethylammonio-12-dodecanoate either in slurry prior to or during comminution pulp sheet formation and prior to pulp sheet drying. The resulting comminution pulp sheet is easily and effectively fiberized or comminuted to yield fibers from which air-laid absorbent products are prepared, and the air-laid absorbent products are characterized by improved bulk, resiliency and absorbency characteristics.

3,617,440

PROCESS FOR PROMOTING THE DRAINAGE FROM A WATER-PULP MEDIUM USING THE REACTION PRODUCT OF A POLYETHYLENIMINE HAVING A MOLECULAR WEIGHT OF AT LEAST 300 WITH A UREA

Greene W. Strother, Jr., Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed June 17, 1968, Ser. No. 737,394
Int. Cl. D21h *3/48*
U.S. Cl. 162—168 10 Claims

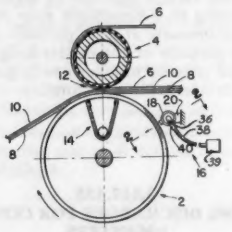
Accelerated drainage of the aqueous medium from pulp during paper manufacture is achieved by the addition of a small amount of the reaction product of polyethylenimine having a molecular weight of at least 300 and a urea. Addition of this product also imparts wet and dry strength to the paper.

3,617,441

SPRAY NOZZLE DEVICE FOR CLEANING ACCUMULATIONS IN SUCTION ROLL OPENINGS

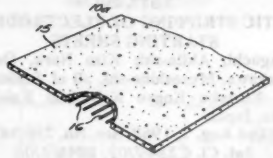
James T. Farrell, Schuylerville, N.Y., assignor to United Board & Carton Corporation, Ridgefield Park, N.J.

Filed Aug. 22, 1968, Ser. No. 754,704
Int. Cl. D21f *1/34*; B08b *3/02, 9/00*
U.S. Cl. 162—199 13 Claims



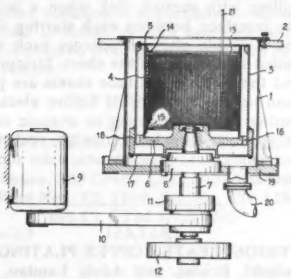
Method and apparatus for removing accumulations of fibers, rosin, clays, etc., from the openings in suction rolls used in the production of paperboard. Jets of water from nozzle openings impact the accumulations in a radially inward direction and unplug the suction roll openings. The ratio of diameters of the suction roll openings to the diameter of the nozzle jet openings is approximately 5.35 to 1. The water is supplied to the nozzle at a pressure of the order of 150 to 200 p.s.i., and each nozzle opening projects a jet of water such that each of the suction openings is independently subjected to the entire impact of the jet.

3,617,442
PAPER-MAKING MEANS AND METHOD
Alfred A. Hurschman, 169 Streetsboro St., Hudson, Ohio
Filed Sept. 30, 1968, Ser. No. 763,512
Int. Cl. D21f 1/00
U.S. Cl. 162—212 6 Claims



For use in a fourdrinier section of a paper machine and/or the felt section of such a machine, a replacement for the fourdrinier wire and/or the felt which comprises a sheet of synthetic, open-celled, flexible foam such as polyurethane foam. According to one aspect of this invention, the foam may be reticulated to provide greater porosity. If the foam is employed as a fourdrinier "wire," the foam is provided with a reinforcing backing means which provides longitudinal strength but does not interfere with the porosity of the foam.

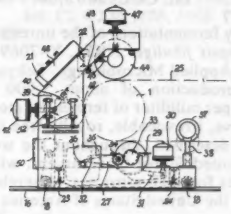
3,617,443
GRAVITY DRAINAGE FROM A ROTOR IN A CENTRIFUGAL FIBROUS SHEET FORMER
Jean-Pierre Chleq, Seyssins, and Gaston Marie Lefebvre, Grenoble, both of France, assignors to Centre Technique de L'Industrie des Papiers, Cartons et Celluloses, Isere, France
Filed Nov. 26, 1969, Ser. No. 880,242
Claims priority, application France, Nov. 29, 1968, 176,066
Int. Cl. D21j 7/00
U.S. Cl. 162—218 6 Claims



Method and apparatus for forming a fibrous sheet in a centrifugal former and draining liquid from the rotor element. Rotation of the rotor produces centrifugal force which facilitates sheet formation on the inside of a cylindrical filter means and forces liquid against an outer cylindrical envelope. Slowing down of the rotation weakens the centrifugal force and allows liquid drainage by gravity through suitable means provided in the lower part of the rotor. A method for removing the filter means with the formed sheet thereon is provided wherein the screen is cut and deformed to allow removal from an opening in the cover of the apparatus.

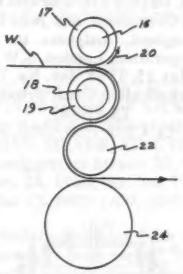
3,617,444
APPARATUS FOR TREATING A WIRE OR FELT IN A PAPERMAKING MACHINE
Narve Hundseid, Baerum, Norway, assignor to Aktieselskabet Thunes Mekaniske Vaerksted, Oslo, Norway
Filed June 2, 1969, Ser. No. 829,680
Claims priority, application Norway, Apr. 24, 1969, 1688/69
Int. Cl. D21f 1/32
U.S. Cl. 162—275 12 Claims

Apparatus for treating an endless wire or felt in a paper making machine which includes C-shaped support frame mounted on tracks for movement of the frame into and out of encompassing relationship with a support roll around which the wire or felt is wrapped. Mounted transversely of the frame is a liquid applicator roll which dips into a transversely mounted liquid trough for application of liquid to the



wire or felt. A press-nip roll, a press roll, and a spray tube are also mounted on the frame for wire or felt treatment. The support roll is also moveably mounted on tracks and compressed air cylinders operate to secure the frame with respect to the support roll.

3,617,445
ROLL COMPOSITION
Donald A. Brafford, Beloit, Wis., assignor to Beloit Corporation, Beloit, Wis.
Continuation-in-part of application Ser. No. 784,606, Dec. 18, 1968. This application June 11, 1969, Ser. No. 832,055
Int. Cl. D21f 3/00
U.S. Cl. 162—358 2 Claims



An apparatus for use in combination with a traveling web, comprising a pair of rolls defining a nip between which said web passes, at least one of said rolls having an outer shell consisting of a nonwoven mat wrapping said roll and bonded with a thermosetting resin. Preferred nonwoven mats for the present invention are acrylic mats, while thermosetting resins most preferred are epoxy resins.

3,617,446
PREPARATION OF 6-AZAURIDINE
Kiyoshi Nakayama, Sagamihara-shi, and Haruo Tanaka, Machida-shi, Tokyo, both of Japan, assignors to Kyowa Hakko Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Sept. 26, 1968, Ser. No. 762,994
Claims priority, application Japan, Sept. 27, 1967, 42/61678
Int. Cl. C12d 13/06
U.S. Cl. 195—28 3 Claims

The present invention relates to a process for preparing 6-azauridine by the dephosphorilation of 6-azauridylic acid by means of micro-organisms.

3,617,447
PRODUCTION OF MEVALONIC ACID BY ENDOMYCOPSIS FIBULIGER

Kei Arima, and Gakuzo Tamura, both of Bunkyo-ku, Tokyo, Japan, assignors to The United States of America as represented by the Secretary of Agriculture

Filed Jan. 9, 1969, Ser. No. 790,162
Int. Cl. C12d *13/00*
U.S. Cl. 195—37 **1 Claim**

Four- to 5-day fermentations of the unrestrictedly available yeast *Endomycopsis fibuliger* NRRL Y–7069 (catalogued by the Institute of Applied Microbiology, Tokyo, as IAM–4347) provides the production of about 1,000 micrograms of mevalonic acid per milliliter of fermented medium.

A nonexclusive, irrevocable, royalty-free license in the invention herein described, throughout the world for all purposes of the United States Government, with the power to grant sublicenses for such purposes, is hereby granted to the Government of the United States of America.

3,617,448
ANTIBIOTIC AND METHODS OF PRODUCING AND USING IT

Elton W. Mann, Portales, N. Mex., assignor to Research Corporation, New York, N.Y.

Continuation-in-part of application Ser. No. 334,907, Dec. 31, 1963, now abandoned. This application Oct. 3, 1967, Ser. No. 672,462
Int. Cl. C12d *9/20*; A61n *9/00*; A61k *21/00*
U.S. Cl. 424—115 **4 Claims**

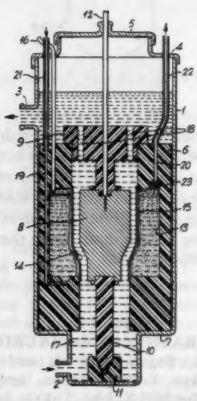
An antibiotic substance is produced by growing *Bacillus uniflagellatus*, sp. n., (ATCC 15134) in a sterile liquid nutrient medium containing sources of assimilable carbon and nitrogen.

A water-soluble antibiotic substance having antifungal, antiviral, antinematodal and antibacterial properties is elaborated by the organism *Bacillus uniflagellatus*, sp. n., (ATCC 15134).

3,617,449
ELECTROLYTIC DEPOSITION

Maurice Eric Giles, Cottenham, and John George Waller, Sutton, both of England, assignors to National Research Development Corporation, London, S.W. 1, England

Filed May 15, 1968, Ser. No. 729,173
Claims priority, application Great Britain, May 19, 1967, 23,476/67
Int. Cl. C23b *7/00, 5/02, 5/68*
U.S. Cl. 204—3 **3 Claims**

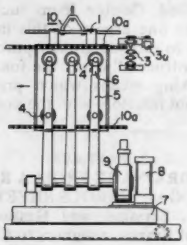


An electrolytic deposition process suitable for use where high deposition rates are required. A metallic powder which reacts with discharged anions is dispersed in the electrolyte adjacent the anode but is prevented from occurring in appreciable concentration in the electrolyte adjacent the cathode. The electrolyte may be arranged to flow continuously over the cathode surface. Specific conditions are disclosed for carrying out the process when depositing nickel, and an apparatus is described for utilizing the process in the electroforming of metallic articles.

3,617,450
AUTOMATIC STRIPPING OF ELECTRODEPOSITED STARTING SHEETS

Ryuzo Kawaguchi, Akita-shi; Kizo Nara, Osaka-shi, and Izumi Sukekawa, Musashino-shi, all of Japan, assignors to Mitsubishi Kinzoku Kogyo Kabushiki Kaisha, Chiyoda-ku,Tokyo-to, Japan

Filed Aug. 7, 1968, Ser. No. 750,947
Int. Cl. C23b *7/02*; B01k *1/00*
U.S. Cl. 204—12 **5 Claims**



Starting sheets (copper sheets electrolytically deposited on cathode base sheets) can be readily stripped from their base sheets by pulling with suction disk when a layer of air is formed in the interface between each starting sheet and its base sheet by a simple physical process such as rolling or vibration applied to one part of the sheet. Stripping is further facilitated and the starting and base sheets are protected by the application on the base sheets before electrolysis of at least one coating agent containing an organic compound of an acid such as phosphoric acid, xanthic acid, thiocarbonic acid, or thiocarbamic acid or an organic ester such as organic phosphorous ester.

3,617,451
THIOSULFATE COPPER PLATING

Leo J. Slominski, Bristol, and Adela Landau, Watertown, both of Conn., assignors to MacDermid Incorporated, Waterbury, Conn.

Filed June 10, 1969, Ser. No. 831,983
Int. Cl. C23b *5/18, 1/00*
U.S. Cl. 204—34 **18 Claims**

A novel electroplating bath suitable for electrodepositing copper on steel which comprises an aqueous solution of soluble copper, an alkali metal thiosulfate, an alkali metal sulfite or bisulfite, and a heterocyclic nitrogen compound such as nicotine, 3-amino-1,2,4-triazole, etc. During the electroplating process, the bath is subjected to aeration. The steel is cleaned and cathodically activated prior to plating.

3,617,452
GOLD PLATING

Carl D. Keith, Summit; Alfred J. Haley, Jr., Florham Park, and Kenneth D. Baker, Bridgewater, Somerville, all of N.J., assignors to Engelhard Minerals & Chemical Corporation, Newark, N.J.

Filed July 3, 1969, Ser. No. 838,944
Int. Cl. C23b *5/28*
U.S. Cl. 204—46 **6 Claims**

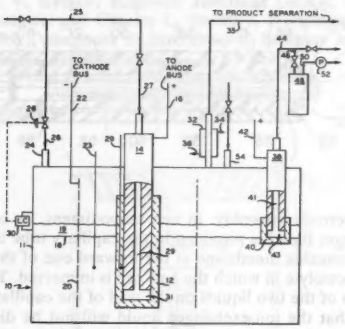
Process for electrodeposition of gold from aqueous gold-plating baths which are substantially free from alkali metal ions and which are comprised of ammonium gold cyanide as the source of gold.

3,617,453

TEMPERATURE CONTROL IN ELECTROCHEMICAL CONVERSION PROCESS

William V. Childs, Austin, Tex., assignor to Phillips Petroleum Company

Filed Sept. 17, 1969, Ser. No. 858,734
Int. Cl. B01k 3/00
U.S. Cl. 204—59 8 Claims



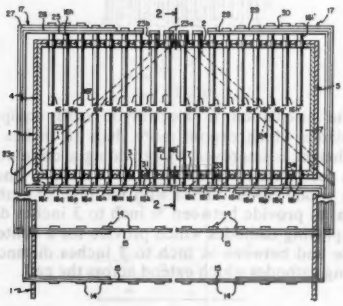
Temperature control in an electrochemical conversion process is effected by maintaining a layer of feedstock on the surface of the electrolyte in an electrolytic cell provided with a porous electrode. A portion of said feedstock layer enters the pores of said porous electrode and is at least partially converted therein. A cell effluent stream is withdrawn through a reflux condenser, is partially condensed, condensate is returned as reflux to cool said cell, and conversion products are recovered from the uncondensed portion of said cell effluent stream.

3,617,454

BUS STRUCTURE FROM ALUMINUM REDUCTION CELLS

Arthur F. Johnson, 203 Creole Lane, Franklin Lakes, N.J.

Filed Nov. 12, 1969, Ser. No. 876,128
Int. Cl. C22d 3/12, 3/02
U.S. Cl. 204—67 17 Claims



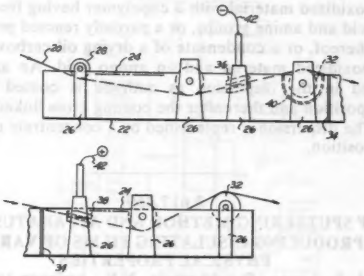
The improvement in electrolytic cells for the reduction of aluminum in which a plurality of cells are electrically connected in a line, the improvement comprising diagonal bus structure for connecting to the cathode collector elements at the upstream side of the cell for directing current therefrom exteriorly of the cell diagonally to the opposite ends.

3,617,455

PROCESS FOR MOLTEN SALT BATH ELECTROLYTIC DESCALING OF FERROUS METAL STRIP

Robert H. Shoemaker, Royal Oak, and John A. Faler, Livonia, both of Mich., assignors to Kolene Corporation, Detroit, Mich.

Filed Feb. 5, 1969, Ser. No. 796,722
Int. Cl. C23b 1/06, 5/68
U.S. Cl. 204—145 1 Claim



Molten salt bath electrolytic descaling apparatus and process employing an electrical shield of aluminum around an immersed cast iron roll and electrically charged oppositely from the electrical charge on the strip to prevent current flow from the strip to the electrolyte through the roll.

3,617,456

BATH FOR THE ELECTROLYTIC STRIPPING OF GALVANIC COATINGS MADE OF NICKEL, CHROMIUM OR GOLD FROM BASE BODIES MADE OF COPPER, COPPER ALLOYS, SILVER, ZINC OR TITANIUM

Horst Dillenberg, Koniggratzer Strasse 25, Haan, Germany

Filed Oct. 28, 1968, Ser. No. 771,349
Int. Cl. B01r 1/00, 3/00
U.S. Cl. 204—146 10 Claims

An aqueous electrolytic-stripping bath to remove nickel, chromium, or gold coatings from copper, copper alloy, silver, zinc, or titanium metal articles comprising ammonium thiocyanate as the stripping component and a phenol to accelerate the stripping and to reduce corrosion of the base metal.

3,617,457

PROCESS FOR THE RADIATION GRAFTING OF 4-VINYL PYRIDINE ONTO POLYESTERS IN THE PRESENCE OF A NONPOLYMERIZABLE ORGANIC ACID

Ichiro Sakurada, Kyoto-shi, Kyoto-fu, and Toshio Okada, Moriguchi-shi, Osaka-fu, both of Japan, assignors to Japan Atomic Energy Research Institute, Minato-ku, Tokyo, Japan

Filed Oct. 7, 1968, Ser. No. 765,413
Claims priority, application Japan, Oct. 16, 1967, 42/66093
Int. Cl. B01j 1/00; G08d 9/10
U.S. Cl. 204—159.15 8 Claims

Polyester fiber material which can be easily dyed with acidic, basic, direct and dispersed dyes was obtained by graft-polymerizing 4-vinyl pyridine onto a polyester fiber material in an aqueous emulsion containing a nonpolymerizable organic or inorganic acid at least in an amount sufficient to neutralize said 4-vinyl pyridine by means of irradiation with a high-energy ionizing radiation.

3,617,458

CATIONIC ELECTRODEPOSITION SYSTEM

Francis Joseph Brockman, Mont-Saint-Hilaire, Canada, assignor to Canadian Industries Limited, Montreal, Quebec, Canada

Filed Dec. 4, 1968, Ser. No. 781,257
Claims priority, application Great Britain, Dec. 12, 1967, 56,426/67
Int. Cl. B01k *5/00*; C23b *13/00*
U.S. Cl. 204—181 10 Claims

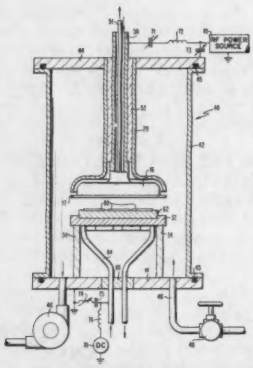
A cross-linkable coating composition derived from an unsaturated compound containing a carboxylic acid group, an epoxidized material and a compound which contains a pendant amine group is dispersed in water by means of an acid such as phosphoric acid. The composition may be a blend of an epoxidized material with a copolymer having free carboxylic acid and amine groups, or a partially reacted precondensate thereof, or a condensate of a drying oil carboxylic acid, an epoxidized material and an amino acid. An article immersed in the dispersion as cathode is coated by electrodeposition and thereafter the coating cross linked by heating. The dispersion is replenished by a concentrate of coating composition.

3,617,459

RF SPUTTERING METHOD AND APPARATUS FOR PRODUCING INSULATING FILMS OF VARIED PHYSICAL PROPERTIES

Joseph S. Logan, Poughkeepsie, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 15, 1967, Ser. No. 668,114
Int. Cl. C23c *15/00*
U.S. Cl. 204—192 12 Claims



An RF sputtering method wherein the potential of the workpiece relative to the plasma is the sputtering chamber is adjusted to provide a control over the physical characteristics of the resulting sputtered films. The apparatus has an insulated target electrode, an insulated workpiece holder electrode, and a conductive surface in contact with the plasma generated by impressing an RF voltage across the target electrode and workpiece holder electrode. An impedance is provided between the workpiece holder electrode and the conductive surface. The impedance provides a control of the workpiece holder voltage.

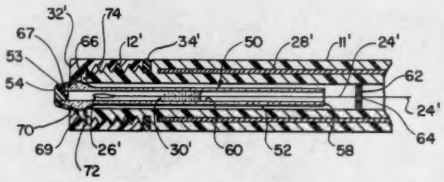
3,617,460

ELECTRODE ASSEMBLY

Irwin H. Krull, and Charles A. Mask, both of Garden Grove, Calif., assignors to Beckman Instruments, Inc.

Filed Dec. 17, 1969, Ser. No. 885,904
Int. Cl. G01n *27/46*
U.S. Cl. 204—195 12 Claims

An electrochemical electrode assembly for making ion concentration measurements in which a capillary tube open at its rear end and closed by an ion-sensitive barrier at its forward end is removably mounted in a tubular electrode body. A conductor fixedly mounted at the rear end of the tubular body extends through the open rear end of the capillary tube for connection to an internal half cell immersed in electrolyte in the tube. Due to the surface tension of the electrolyte on the wall of the capillary tube, the electrolyte will not escape through the open end of the tube during normal handling of



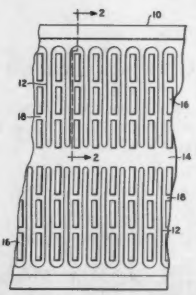
the electrode assembly. In one embodiment, an organic ion exchanger liquid is provided in the capillary tube between an ion-permeable membrane at the forward end of the tube and the electrolyte in which the half cell is immersed. The surface tension of the two liquids on the wall of the capillary tube ensures that the ion-exchanger liquid will not be displaced by the electrolyte and, therefore, the ion exchanger will remain in contact with the membrane.

3,617,461

SPACED ANODE ASSEMBLY FOR DIAPHRAGM CELLS

John E. Currey, Lewiston, and Walter W. Ruthel, Niagara Falls, both of N.Y., assignors to Hooker Chemical Corporation, Niagara Falls, N.Y.

Filed June 3, 1968, Ser. No. 733,988
Int. Cl. C01d *1/06*
U.S. Cl. 204—252 4 Claims



Anolyte circulation in electrolytic cells equipped with anode blades which expose more than 18 inches of active surface height is improved by providing a circulation space between each anode blade in a bank of anodes. The distance between anode blades varies with the type of cathode construction, to provide between ¾ inch to 3 inches distance in cells employing cathodes which provide for a center circulation aisle and between ¼ inch to 3 inches distance in cells employing cathodes which extend across the cell.

3,617,462

PLATINUM TITANIUM HYDRIDE BIPOLAR ELECTRODES

Bernard DeWitt, Akron, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed May 6, 1968, Ser. No. 726,865
Int. Cl. B01k *3/04*
U.S. Cl. 204—290 F 4 Claims

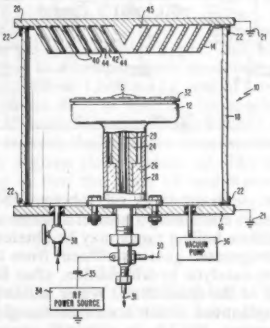
Titanium hydride electrodes are disclosed for use in alkali metal chlorine and chlorate cells. The electrodes disclosed

are noble metal coated for use as cell anodes in chlorine and chlorate cells or as bipolar electrode elements in chlorine and chlorate cells. The use of titanium hydride electrodes as cathodes in chlorine and chlorate cells is also shown. The noble metal surfaces disclosed are gold, silver, platinum, palladium, iridium and ruthenium. Platinum is disclosed as the preferred noble metal surface.

3,617,463
APPARATUS AND METHOD FOR SPUTTER ETCHING

Lawrence V. Gregor, Hopewell Junction; Leon I. Maissel, Poughkeepsie, and Charles L. Standley, Wappingers Falls, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 18, 1969, Ser. No. 834,444
Int. Cl. C23c *15/00*
U.S. Cl. 204—298 **7 Claims**

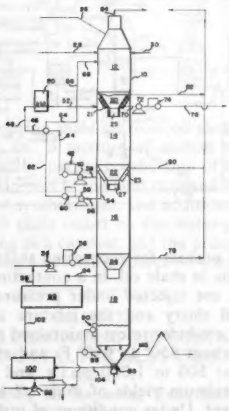


The object to be sputter etched is excited in a reduced atmosphere of inert gas by the application of an RF potential across a pair of electrodes, one of which supports the object and is capacitively coupled to the RF source. The improvement is a means to catch and retain material removed by the sputtering operation.

3,617,464
COAL EXTRACTION METHOD AND APPARATUS

Cecil J. Johnson, Columbia City, Ind., assignor to Total Energy Corporation, Columbia City, Ind.

Continuation of application Ser. No. 810,135, Mar. 25, 1969, now abandoned. This application May 20, 1970, Ser. No. 37,490
Int. Cl. C10g *1/00*
U.S. Cl. 208—8 **10 Claims**

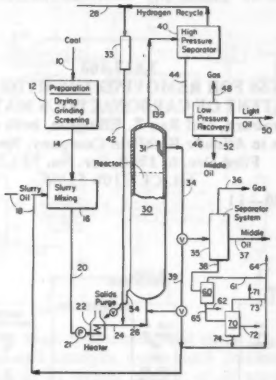


Method for extracting coil liquids from a continuously moving bed of coal solids comprising the steps of moving the coal solids through extractor and stripper zones in a stream of sand which serves as a conveyor for the coal solids. The sand also serves as a cleaning means for filter screens used in the process. Further, the sand stream permits the coal liquids to swell freely.

3,617,465
COAL HYDROGENATION

Ronald H. Wolk, Lawrence Township, Mercer Co.; Edwin S. Johanson, Princeton, and Seymour B. Alpert, Princeton, all of N.J., assignors to Hydrocarbon Research, Inc., New York, N.Y.

Filed Nov. 20, 1969, Ser. No. 878,268
Int. Cl. C10g *1/14, 1/06*
U.S. Cl. 208—8 **9 Claims**

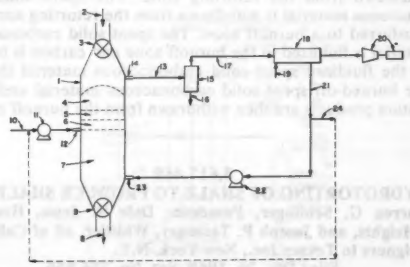


A coal hydrogenation process employing an expanded particulate solids bed wherein the solids are derived from the coal which is placed in random motion by the upflow of a slurry of coal, hydrocarbon liquid and hydrogen to produce better than 80 percent conversion of coal to gas and liquid synthetic petroleum products. The particulate solids bed is derived from the coal being fed to the reaction zone.

3,617,466
GAS COMBUSTION RETORT PROCESS

John C. Todd, Tulsa, Okla., assignor to Atlantic Richfield Company, New York, N.Y.

Filed Dec. 6, 1968, Ser. No. 781,766
Int. Cl. C10b *53/06*
U.S. Cl. 208—11 **8 Claims**



An improved method for obtaining oil from oil shale by the gas combustion retort process. The offgas from the retort containing oil, fuel and other combustion products is treated first to remove the oil and second, to burn the fuel components. The resulting gas is recycled into the retort to pass countercurrently to the shale travel. Temperatures in the combustion zone of the retort are moderated and clinker formation is eliminated. The heat from the fuel burning can be used as a power source.

3,617,467

PROCESSES FOR RETORTING OIL SHALE

Alan K. Reyburn, and Rex T. Ellington, Jr., both of Tulsa, Okla., assignors to Atlantic Richfield Company, New York, N.Y.

Filed Dec. 6, 1968, Ser. No. 781,901
Int. Cl. C10g *1/02*
U.S. Cl. 208—11 7 Claims

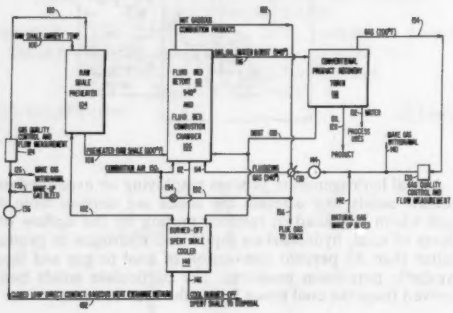
An improvement in the processes for the recovery of volatile material from solid carbonaceous material, such as oil shale, tar sands, coal, lignite, and the like, which comprises controlling the atmosphere surrounding the carbonaceous material during retorting. The atmosphere is controlled to contain natural gas or a gas of similar composition or mixtures of natural gas and up to 20 percent carbon dioxide. Improved yields are achieved in various retorting processes.

3,617,468

PROCESS FOR REMOVING THE HYDROCARBON CONTENT OF CARBONACEOUS MATERIALS

Alan K. Reyburn, and Rex T. Ellington, both of Tulsa, Okla., assignors to Atlantic Richfield Company, New York, N.Y.

Filed Dec. 6, 1968, Ser. No. 781,754
Int. Cl. C10b *53/06*
U.S. Cl. 208—11 20 Claims



A process for the recovery of volatile material from solid carbonaceous material, such as oil shale, tar sands, coal, lignite and the like, which comprises introducing the solid carbonaceous material into a retorting zone and fluidizing the solid carbonaceous material within the retorting zone. The fluidized solid carbonaceous material in the retorting zone is heated and volatile material is retorted therefrom and withdrawn from the retorting zone. The spent solid carbonaceous material is withdrawn from the retorting zone and transferred to a burnoff zone. The spent solid carbonaceous material is fluidized in the burnoff zone and carbon is burned off the fluidized spent solid carbonaceous material therein. The burned-off spent solid carbonaceous material and combustion products are then withdrawn from the burnoff zone.

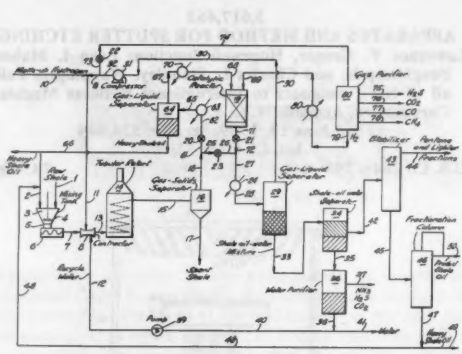
3,617,469

HYDROTORTING OF SHALE TO PRODUCE SHALE OIL

Warren G. Schlinger, Pasadena; Dale R. Jesse, Hacienda Heights, and Joseph P. Tassoney, Whittier, all of Calif., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 26, 1968, Ser. No. 786,955
Int. Cl. C01b *53/06*
U.S. Cl. 208—11 2 Claims

Continuous process for recovering shale oil from a slurry of raw oil shale in shale oil. Water and hydrogen gas are injected under pressure into the raw oil shale—shale oil slurry, and the mixture is immediately introduced into an externally heated noncatalytic tubular retort maintained at an outlet temperature in the range of about 850° to 950° F. and at a pressure in the range of about 300 to 1,000 p.s.i.g., and preferably at 500 p.s.i.g. for maximum yields of shale oil having a minimum nitrogen content. In the tubular retort under conditions of turbulent flow, the raw shale is completely stripped of kerogen in about ¼ to 3 minutes (preferably less than a minute), and by simultaneous pyrolysis and hydrogenation without added catalyst, the kerogen is converted to a gaseous effluent from which shale oil is separated having a substantially reduced nitrogen and sulfur content. Yields of such shale oil from for example Colorado shale are about 116 percent of the Fischer Assay; however, if desired,



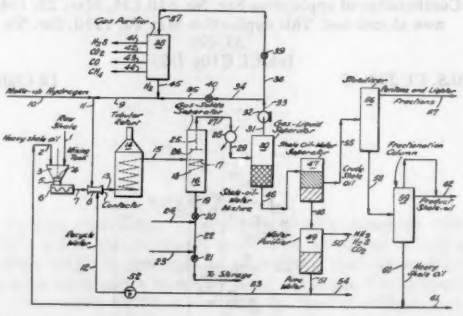
still higher yields of shale oil (about 125 percent of the Fischer Assay) containing a greater amount of material in the middle distillate boiling range may be obtained by submitting the prehydrogenated gaseous effluent from the tubular reaction zone to catalytic hydrogenation, after first removing essentially all of the spent shale. Water is also produced by the system in quantities which are in excess of process requirements.

3,617,470

HYDROTORTING OF SHALE TO PRODUCE SHALE OIL

Warren C. Schlinger, Pasadena; Dale R. Jesse, Hacienda Heights, and Joseph P. Tassoney, Whittier, all of Calif., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 26, 1968, Ser. No. 786,952
Int. Cl. C10b *53/06*
U.S. Cl. 208—11 11 Claims



Continuous process for recovering shale oil from a slurry of raw oil shale in shale oil. In a contacting zone, water and hydrogen gas are injected under pressure into the raw oil shale-shale oil slurry and the mixture is immediately introduced into a tubular retort maintained at a temperature in the range of about 850° to 950° F. and at a pressure in the range of about 300 to 1,000 p.s.i.g. and preferably at 500 p.s.i.g. for maximum yields of shale oil having a minimum nitrogen content. Under conditions of turbulent flow, in the tubular retort the raw shale is completely stripped of kerogen in about one-fourth to 3 minutes (preferably less than a minute), and by simultaneous pyrolysis and hydrogenation the kerogen is converted to a gaseous effluent from which

shale oil is separated having a substantially reduced nitrogen and sulfur content. Further, essentially all of the spent shale is removed from the gaseous stream by means of a unique centrifugal separator and recovered without the loss of hydrogen or the reduction in line pressure, as spent shale containing essentially no carbonaceous residue. Yields of such shale oil from for example Colorado shale are about 116 percent of the Fischer Assay and contain less than 0.50 weight percent of spent shale. Water is also produced by the system in quantities which are in excess of process requirements.

3,617,471

HYDROTORTING OF SHALE TO PRODUCE SHALE OIL

Warren G. Schlinger, Pasadena; Dale R. Jesse, Hacienda Heights, and Joseph P. Tassoney, Whittier, all of Calif., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 26, 1968, Ser. No. 787,207
Int. Cl. C10b *53/06*
U.S. Cl. 208—11 **8 Claims**

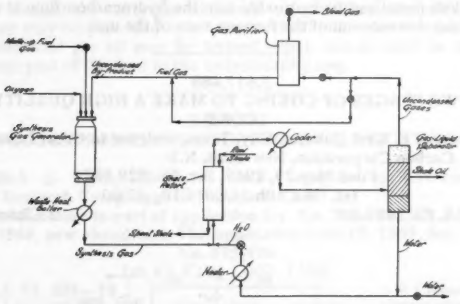
Hydrogen-rich gas, e.g., synthesis gas, and H_2O are injected into oil shale at a comparatively moderate pressure in the range of about 300 to 1,000 p.s.i.g. and at a temperature in the range of about 850° to 950° F., for producing high-quality shale oil in yields that exceed the Fischer Assay. The addition of H_2O reduces the hydrogen consumption and heat load required for a given yield of shale oil. The process can be self-sustaining in that the shale oil and water produced may be used for making the synthesis gas used in the hydrogenation and denitrification of the shale oil.

3,617,472

PRODUCTION OF SHALE OIL

Warren G. Schlinger, Pasadena; Dale R. Jesse, Hacienda, and Joseph P. Tassoney, Whittier, all of Calif., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 31, 1969, Ser. No. 889,449
Int. Cl. C10b *53/06*
U.S. Cl. 208—11 **7 Claims**



Process for recovering shale oil from oil shale by retorting with synthesis gas, i.e., a mixture of carbon monoxide and hydrogen, generated by partial combustion of byproduct gas with oxygen, wherein part of the heat required for retorting is provided by the hot synthesis gas, and additional hydrogen is produced in the oil shale retort by the water-gas shift reaction, the shale acting as a catalyst; and the process being self-sufficient in requiring no external source of water.

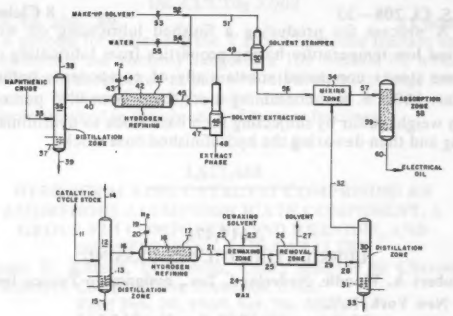
3,617,473

ELECTRICAL INSULATING OIL CONTAINING A HYDROTREATED CATALYTICALLY CRACKED CYCLE OIL

Thomas G. Lipscomb, II, Baytown, Tex., assignor to Esso Research and Engineering Company

Filed Feb. 27, 1970, Ser. No. 14,986
Int. Cl. C10g *23/00;* **H01b** *3/22*
U.S. Cl. 208—14 **21 Claims**

The oxidative resistance of a mineral base oil useful as an electrical insulating oil but deficient in oxidative resistance is improved while the impulse strength of the oil is retained at an acceptable level, at least about 140 kv., by combining from about 80 to about 97 parts of the mineral base oil with from about 20 to about 3 parts of a hydrogen-refined light catalytic cycle stock fraction which boils above about 450° F. and below about 690° F., preferably below about 660° F., and has a 50 percent distillation point of at least about 550° F. This fraction of light catalytic cycle stock contains no more than about 1.0 weight percent of aromatic hydrocarbon



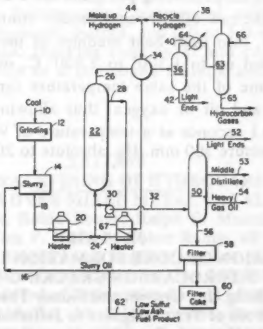
compounds of at least four condensed rings. The blend of mineral base oil and catalytic cycle stock fraction contains no more than about 22 weight percent of all aromatic compounds and has no more than about 0.10 weight percent of aromatic hydrocarbon compounds of at least four condensed rings. The catalytic cycle stock fraction may be dewaxed before addition to the mineral base oil, and the resultant blend may be treated with activated earth for additional color and oxidation stability improvement.

3,617,474

LOW SULFUR FUEL OIL FROM COAL

Harold H. Stotler, Westfield, N.J.; Michael Calderon, Flushing, N.Y., and Clarence A. Johnson, Princeton, N.J., assignors to Hydrocarbon Research, Inc., New York, N.Y.

Filed June 10, 1970, Ser. No. 45,081
Int. Cl. C01g *1/06*
U.S. Cl. 208—10 **9 Claims**



The economic production of a low sulfur residual fuel oil by the hydroconversion of coal is accomplished in an "ebullated" bed system in the absence of downstream processing and the use of a minimum of hydrogen to produce a fuel of high B.t.u. value and low sulfur content.

3,617,475

PROCESS FOR PRODUCING LUBRICATING OILS WITH GOOD LOW TEMPERATURE HAZING PROPERTIES

William C. Offutt, Pittsburgh; Richard G. Goldthwait, Pittsburgh; James R. Murphy, Springdale, and Harry C. Stauffer, Cheswick, all of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Continuation-in-part of application Ser. No. 533,456, Mar. 11, 1966, now abandoned, Continuation of application Ser. No. 754,475, Aug. 21, 1968, now abandoned. This application Jan. 15, 1970, Ser. No. 4,172

Int. Cl. C10g *23/02*

U.S. Cl. 208—33 8 Claims

A process for producing a finished lubricating oil with good low-temperature hazing properties from lubricating oil base stocks comprised substantially of components boiling above 800° F. and containing more than about 0.75 percent by weight sulfur by subjecting such base stock to hydrofinishing and then dewaxing the hydrofinished base stock.

3,617,476

LUBRICATING OIL PROCESSING

Robert A. Woodle, Nederland, Tex., assignor to Texaco Inc., New York, N.Y.

Filed Apr. 10, 1969, Ser. No. 815,233

Int. Cl. C10g *43/08*

U.S. Cl. 208—36 10 Claims

Lubricating oils of high-viscosity index are produced in good yield by a sequence involving mild hydrogenation, solvent refining and dewaxing. The process is particularly effective for the treatment of lube oil fractions containing at least 1 percent Conradson Carbon Residue using N-methyl pyrrolidone as the solvent.

3,617,477

PROCESS FOR PRODUCING A PITCH AND TARRY SUBSTANCE

Shimpei Gomi, and Takuji Hosoi, both of Tokyo, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 27, 1969, Ser. No. 869,914

Claims priority, application Japan, Nov. 6, 1968, 43/80593

Int. Cl. C10c *3/00*; C10g *9/36*, *9/40*

U.S. Cl. 208—40 3 Claims

A process for producing pitch and tar characterizing by introducing the raw oil, whose aromatic content is more than 80 percent, into such heat medium as inert gases such as steam heated up to 1,300° to 2,500° C. or complete combustion flame of the same temperature range produced by using fuel and air or oxygen, thus allowing it to react for 0.001 to 0.1 seconds at a temperature of 900° to 1,500° C. under a pressure 300 mm./Hg. absolute to 20 kg./cm.^{2} gauge.

3,617,478

SUPPRESSION OF COKE FORMATION IN A THERMAL HYDROCARBON CRACKING UNIT

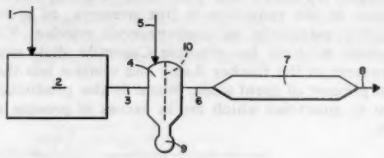
James Ely King, Jr., Groves, and Sidney Theodore Jones, Port Neches, both of Tex., assignors to Jefferson Chemical Company, Inc., Houston, Tex.

Continuation-in-part of application Ser. No. 872,220, Oct. 29, 1969, now abandoned. This application July 20, 1970, Ser. No. 56,264

Int. Cl. C10g *9/16*; C07c *5/18*, *11/06*

U.S. Cl. 208—48 AA 9 Claims

Coke formation and deposits in the inline heat exchanger of a thermal hydrocarbon cracking unit comprised of a thermal-cracking zone, a quenching apparatus and the heat exchanger are removed and prevented by introducing an aqueous solution of an alkali metal salt or hydroxide into the



hydrocarbon flow at a point downstream of the cracking zone of the unit.

3,617,479

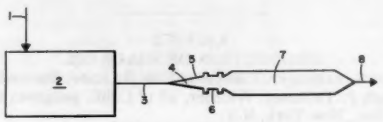
SUPPRESSION OF COKE AND HEAVY HYDROCARBON FORMATION IN HYDROCARBON UNITS

James Ely King, Jr., Groves, and Sidney Theodore Jones, Port Neches, both of Tex., assignors to Jefferson Chemical Company, Inc., Houston, Tex.

Continuation-in-part of application Ser. No. 872,220, Oct. 29, 1969, now abandoned. This application July 20, 1970, Ser. No. 56,486

Int. Cl. C10g *9/16*; C07c *11/06*, *5/18*

U.S. Cl. 208—48 AA 9 Claims



Coke formation and deposits in thermal and catalytic hydrocarbon cracking units and catalytic dehydrogenation units are suppressed by introducing an aqueous solution of an alkali metal salt or hydroxide into the hydrocarbon flow at a point downstream of the furnace zone of the unit.

3,617,480

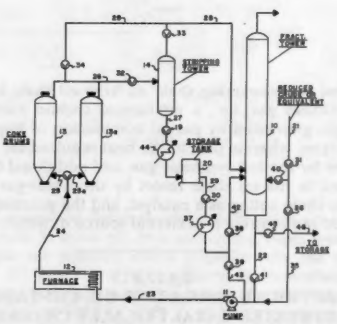
TWO STAGES OF COKING TO MAKE A HIGH QUALITY COKE

Harvey E. Keel, Johnson City, Tenn., assignor to Great Lakes Carbon Corporation, New York, N.Y.

Filed May 29, 1969, Ser. No. 829,082

Int. Cl. C10b *55/00*; C10g *37/00*

U.S. Cl. 208—50 3 Claims



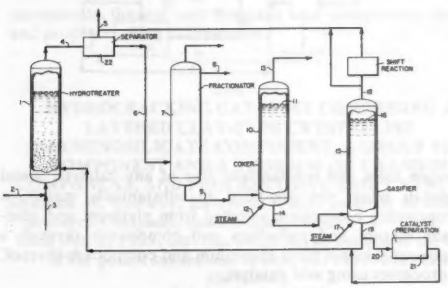
The coking process disclosed herein provides a method for producing high quality petroleum coke which is particularly suitable for use in manufacturing electrothermic graphite electrodes. A high-boiling gas oil fraction is obtained from the overhead products produced during the coking of a petroleum oil residuum. This high-boiling gas oil fraction is

segregated during the manufacture of regular or average quality petroleum coke and is subsequently coked in a separate coking operation under delayed coking conditions of time, temperature and pressure to produce a superior quality petroleum coke.

3,617,481
COMBINATION DEASPHALTING-COKING-HYDROTREATING PROCESS

Alexis Voorhies, Jr., and Glen P. Hamner, both of Baton Rouge, La., assignors to Esso Research and Engineering Company

Filed Dec. 11, 1969, Ser. No. 884,181
Int. Cl. C10g *31/14, 37/00*
U.S. Cl. 208—50 **16 Claims**



A heavy hydrocarbon residuum is hydrotreated or deasphalted to form a heavy bottoms fraction in which the metals are concentrated. The high-metals fraction is coked to form coke containing the metals and the coke is activated by gasification to form water gas. The activated coke containing the metals, with or without fortification by additional catalytic elements is used as catalyst in a hydrotreating step which may be the hydrotreating step used to concentrate the metals or may be a separate step in which the raffinate with or without the coker gas oil is used as feed. The deasphalting step may be preceded by a vacuum distillation step in which additional gas oil may be formed which can be used as at least part of the feed to the hydrotreating step.

3,617,482
PROCESS FOR THE PRODUCTION OF LUBRICATING OILS

Clark J. Egan, Piedmont, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of application Ser. No. 748,979, July 31, 1968, now abandoned. This application Nov. 10, 1969, Ser. No. 875,496
Int. Cl. C10g *13/02, 37/02*
U.S. Cl. 208—59 **8 Claims**

Lubricating oil production process comprising hydrocracking in a first zone a hydrocarbon oil feed in the presence of a hydrocracking catalyst comprising silica and alumina and containing more alumina then silica, hydrocracking in a second zone a second hydrocarbon oil feed, together with a wax-containing hydrocarbon fraction from said first zone, in the presence of a hydrocracking catalyst comprising silica and alumina and containing more alumina than silica, and recovering from the effluent of said second zone at least one light neutral oil having a VI above 100.

3,617,483
HYDROCRACKING PROCESS

Edward T. Child, Fishkill; Reese A. Peck, Fishkill, and Donald A. Messing, Wappingers Falls, all of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Apr. 25, 1968, Ser. No. 724,286
Int. Cl. C10g *37/02;* **B01j** *11/22*
U.S. Cl. 208—59 **8 Claims**

A two-stage hydrocracking process for the conversion of heavy hydrocarbon fractions containing at least 50 p.p.m. nitrogen into lighter products using in both stages a catalyst containing a hydrogenating component supported on a mixture of a modified crystalline zeolite and at least one amorphous inorganic oxide.

3,617,484
INCREASING THE V.I. OF HYDROCRACKED LIGHT LUBES

Sheldon L. Thompson, Glen Mills; Albert T. Olenzak; Rene F. Kress, Media, Pa., and Ib Steinmetz, Wilmington, Del., assignors to Sun Oil Company, Philadelphia, Pa.

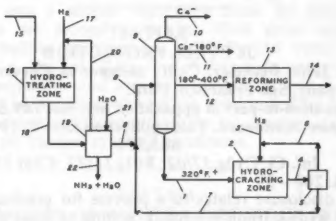
Filed Nov. 29, 1968, Ser. No. 780,241
Int. Cl. C10g *37/02*
U.S. Cl. 208—59 **5 Claims**

A process for increasing the V.I. of a light lube fraction approximating the viscosity range of a 100 Neutral oil which has been hydrocracked as part of a relatively wide-range lube fraction wherein the light lube fraction is isolated and rehydrocracked in the absence of heavier fractions.

3,617,485
HYDROCRACKING CATALYST COMPRISING AN AMORPHOUS ALUMINOSILICATE COMPONENT, A GROUP VIII COMPONENT AND RHENIUM, AND PROCESS USING SAID CATALYST

James R. Kittrell, El Cerrito, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Feb. 20, 1969, Ser. No. 801,007
Int. Cl. C10g *13/10;* **B01j** *11/08*
U.S. Cl. 208—59 **17 Claims**



A hydrocracking catalyst comprising an amorphous aluminosilicate cracking component having a silica-to-alumina weight ratio from 30:70 to 95:5, 0.005 to 2.0 weight percent, based on said cracking component and calculated as the metal, of a hydrogenating component selected from platinum and compounds thereof, palladium and compounds thereof, and iridium and compounds thereof, 0.005 to 2.0 weight percent, based on said cracking component and calculated as the metal, of a hydrogenating component selected from rhenium and compounds thereof, and 0.0 to 5.0 weight percent, based on said cracking component and calculated as fluorine, of fluorine or a compound thereof, and processes using said catalyst.

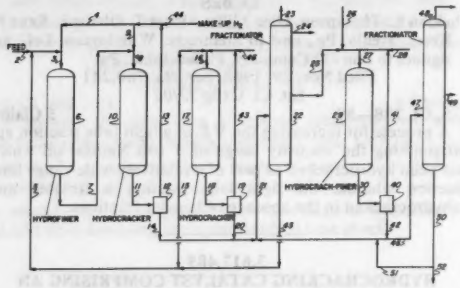
3,617,486
HYDROCRACKFINING OF HYDROCARBON FRACTIONS OVER MIXED METAL CATALYSTS

William R. Lewis, Baton Rouge; Ralph B. Mason, Denham Springs, and Glen P. Hamner, Baton Rouge, all of La., assignors to Esso Research and Engineering Company

Continuation-in-part of application Ser. No. 640,588, May 23, 1967, now abandoned , Continuation-in-part of application Ser. No. 785,115, Dec. 19, 1968, now abandoned. This application Nov. 25, 1969, Ser. No. 879,941
Int. Cl. C01b *33/28;* **C10g** *13/04, 37/00*
U.S. Cl. 208—59 **26 Claims**

A process for upgrading low octane heavy naphtha, such as a 350°–430° F. cut from a conventional hydrocracking operation, or normally virgin crude fractions used to prepare premium jet fuel and middle distillate, as well as mixtures of the cracked and virgin fractions. By treating such hydrocarbons, e.g., the 350°–430° F. cut, alone or in admixture with

other hydrocarbons, with a dual functional catalyst composition comprising a metal hydrogenation component composited with a crystalline aluminosilicate zeolite cracking component, product quality is upgraded. The conditions utilized in the process are less severe than that normally utilized in a hydrocracking operation but more severe than generally employed in hydrocracking operations so as to result in the conversion of the 350°–430° F. hydrocrackate fraction into a high-octane number C_5–350° F. naphtha. This C_5–350° F. naphtha product is amenable to further improvement by powerforming and/or special recycle. Catalysts which are of special interest in the practice of the "hydrocrackfining process" comprise the mixed nonnoble metal catalysts supported on crystalline aluminosilicate zeolites having a silica-to-alumina mole ratio greater than 3.



3,617,487

JET FUEL PRODUCTION

Joseph Jaffe, Berkeley, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of application Ser. No. 749,836, Aug. 2, 1968, now abandoned. This application Dec. 9, 1969, Ser. No. 883,590

Int. Cl. C10g *37/02;* **B01j** *11/22;* **C10l** *1/04*

U.S. Cl. 208—59 **7 Claims**

The disclosure relates to a process for producing jet fuel from a hydrocarbon feedstock boiling at least partly above the jet fuel range, which comprises:

a. Contacting the feedstock in a first zone, at elevated temperature and pressure and in the presence of hydrogen, with a catalyst comprising a crystalline zeolitic molecular sieve dispersed in a nonzeolitic hydrocracking catalyst matrix;

b. Operating the first zone at conditions to obtain between 10 and 35 percent conversion of the feedstock to material boiling in the jet fuel range and withdrawing a first zone effluent comprising partially converted feedstock;

c. Passing at least a portion of the first zone effluent from the first zone to a second zone;

d. Contacting said portion of the first zone effluent in the second zone, at elevated temperature and pressure and in the presence of hydrogen, with an amorphous catalyst comprising metals or compounds of metals selected from Group VI or VIII or both of these groups, and a siliceous cracking component; and

e. Operating the second zone at conditions to obtain between 10 and 45 percent conversion of said portion of the first zone effluent to material boiling in the jet fuel range.

Preferably, the first and second zones are contained in one common reactor vessel.

3,617,488

HYDROTREATING CATALYST COMPRISING CLAY-TYPE ALUMINOSILICATE COMPONENT AND A CRYSTALLINE ZEOLITIC MOLECULAR SIEVE COMPONENT, AND PROCESS USING SAID CATALYST

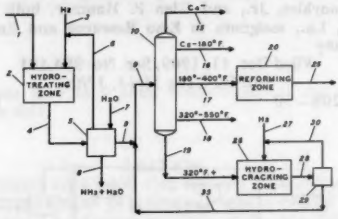
Sigmund M. Csicsery, 1145 Garden Lane, Lafayette, Calif.

Filed Dec. 19, 1969, Ser. No. 886,710

Int. Cl. C01b *33/28;* **C10g** *13/04, 37/00*

U.S. Cl. 208—59 **20 Claims**

A catalyst comprising an interstratified synthetic crystalline aluminosilicate cracking component and a crystalline zeolitic molecular sieve component, which may be dispersed in a matrix comprising a siliceous gel, if desired one or both of said components being substantially in the ammonium or hydrogen form and substantially free of any catalytic metal or metals when dispersed in a matrix, and if desired one of said components being substantially in the ammonium or hydrogen form and substantially free of any catalytic metal or metals when not dispersed in substantially matrix, a hydrogenating component selected from platinum and compounds thereof and palladium and compounds thereof, a component selected from chromium and compounds thereof, and processes using said catalyst.



3,617,489

HYDROCRACKING CATALYST COMPRISING A LAYERED CLAY-TYPE CRYSTALLINE ALUMINOSILICATE COMPONENT, A GROUP VIII COMPONENT AND GOLD, PROCESS USING SAID CATALYST

Sigmund M. Csicsery, Lafayette, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed June 25, 1969, Ser. No. 836,302The portion of the term of the patent subsequent to Dec. 15, 1978, has been disclaimed.

Int. Cl. C10g *13/02*

U.S. Cl. 208—60 **21 Claims**

A hydrocracking catalyst comprising a layered clay-type crystalline aluminosilicate cracking component, 0.01 to 2.0 weight percent, based on said cracking component and calculated as the metal, of a hydrogenating component selected from platinum and compounds thereof, palladium and compounds thereof, rhodium and compounds thereof, ruthenium and compounds thereof, iridium and compounds thereof, and nickel and compounds thereof, and 0.01 to 5.0 weight percent, based on said cracking component and calculated as the metal, of a hydrogenating component selected from the group consisting of gold and compounds thereof, and processes using said catalyst.

3,617,490

HYDROCRACKING CATALYST COMPRISING A LAYERED CLAYsTYPE CRYSTALLINE ALUMINOSILICATE COMPONENT, A GROUP VIII COMPONENT, AND A CHROMIUM OR TUNGSTEN COMPONENT, AND PROCESS USING SAID CATALYST

Sigmund M. Csicsery, Lafayette, Calif., assignor to Chevron Research Company, San Francisco, Calif.

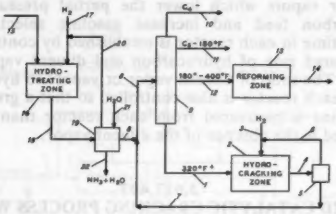
Filed July 8, 1969, Ser. No. 839,999 The portion of the term of the patent subsequent to Dec. 15, 1987, has been disclaimed.

Int. Cl. C01b *33/28;* **C10g** *13/04, 37/00*

U.S. Cl. 208—60 **19 Claims**

A hydrocracking catalyst comprising a layered clay-type crystalline aluminosilicate cracking component, 0.01 to 2.0 weight percent, based on said cracking component and calculated as the metal, of a hydrogenating component selected from platinum and compounds thereof, palladium and compounds thereof, rhodium and compounds thereof, ruthenium and compounds thereof, and iridium and compounds thereof, and 0.01 to 5.0 weight percent, based on said cracking com-

ponent and calculated as the metal, of a hydrogenating component selected from the group consisting of chromium and



compounds thereof and tungsten and compounds thereof, and processes using said catalyst.

3,617,491

HYDROCRACKING CATALYST COMPRISING A LAYERED CLAY-TYPE CRYSTALLINE ALUMINOSILICATE COMPONENT, A GROUP VIII COMPONENT AND A THORIUM OR URANIUM COMPONENT, AND PROCESS USING SAID CATALYST

Sigmund M. Csicsery, Lafayette, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Oct. 6, 1969, Ser. No. 863,976The portion of the term of the patent subsequent to Dec. 15, 1987, has been disclaimed.

Int. Cl. C10g *13/02*

U.S. Cl. 208—60 **19 Claims**

A hydrocracking catalyst comprising a layered clay-type crystalline aluminosilicate cracking component, 0.01 to 2.0 weight percent, based on said cracking component and calculated as the metal, of a hydrogenating component selected from platinum and compounds thereof, palladium and compounds thereof, rhodium and compounds thereof, ruthenium and compounds thereof, and iridium and compounds thereof, and 0.01 to 5.0 weight percent, based on said cracking component and calculated as the metal, of a hydrogenating component selected from the group consisting of thorium and compounds thereof and uranium and compounds thereof, and processes using said catalyst.

3,617,492

PROCESS FOR CATALYTIC REFORMING WITH HIGH PROPANE YIELD

Maurice G. Lorenz, Baton Rouge, La., and Charles Kirk Brown, Florham Park, N.J., assignors to Esso Research and Engineering Company

Filed Jan. 15, 1969, Ser. No. 791,487

Int. Cl. C10g *35/04, 39/00*

U.S. Cl. 208—66 **5 Claims**

An improved hydroforming process wherein the n-paraffins in the hydroformer feed are converted to normally gaseous hydrocarbons, particularly propane. The improvement is accomplished by placing a selective hydrocracking catalyst comprising hydrogen-erionite in the bottom of the lead reactor of a multiple-stage, fixed-bed hydroforming process. The normally gaseous hydrocarbons are separated from the lead reactor effluent. The propane yield can be maximized, and the octane rating of the hydroformer product is improved.

3,617,493

PROCESS FOR STEAM CRACKING CRUDE OIL

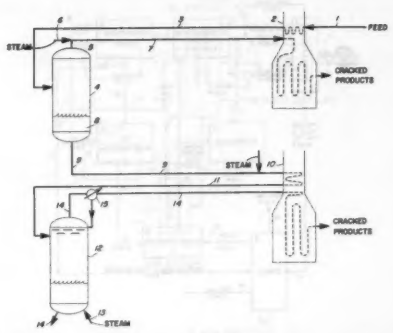
Guy B. Wirth, Florham Park, and Charles E. Jahnig, Rumson, both of N.J., assignors to Esso Research and Engineering Company

Filed Jan. 12, 1970, Ser. No. 2,258

Int. Cl. C10g *9/36*

U.S. Cl. 208—80 **17 Claims**

An improved process for steam cracking a crude oil feed to produce products useful as chemical raw materials or fuels characterized by the steps wherein the crude oil feed is first passed through the convection section of a steam cracking furnace to vaporize the materials in the feed boiling below about 450° F., i.e., a naphtha fraction. The vaporized portion of the crude oil feed is then separated from the liquid portion of the feed by passing the liquid and vapor fractions into a separation zone, i.e., a flash drum separator wherein the vaporized portion of the feed passes overhead and is then fed, with steam, into the steam cracking furnace and subjected to short residence time, high-temperature cracking conditions. The liquid portion of the feed i.e., nonvaporized portion which settles to the bottom of the flash drum separator is withdrawn therefrom and passed through the convection section of a second steam cracking furnace and thereafter into a second separation zone. By introducing steam into the second zone, i.e., flash drum separator, materials boiling above about 450° F. and below about 1,100° F., i.e., the gas oil fraction of the crude, pass overhead from the separator and are then introduced into a second steam cracking furnace, without the need to further add substantial amounts of diluent steam, to be cracked under optimum gas oil fraction cracking conditions.



3,617,494

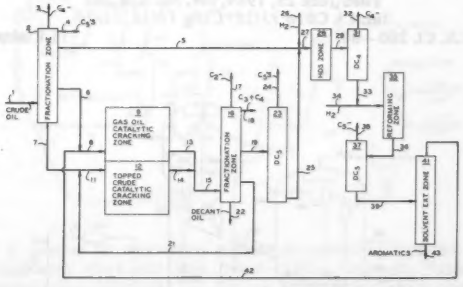
PRODUCTION OF NAPHTHA FEEDSTOCK FROM CRUDE OIL

Dean P. Montgomery, Bartlesville, Okla., assignor to Phillips Petroleum Company

Filed Jan. 22, 1970, Ser. No. 4,990

Int. Cl. C10g *39/00*

U.S. Cl. 208—80 **7 Claims**

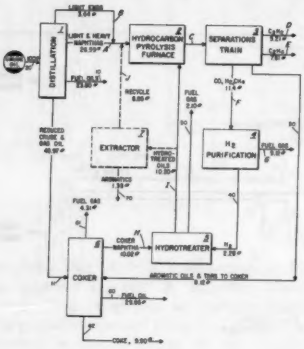


A process for improved production of aromatics-rich naphtha from crude oils: crude oil is fractionated to produce a virgin naphtha, gas oil is combined with paraffinic raffinate and cracked, and bottoms which is combined with fractionator cycle oil and cracked. Products of cracking are combined and fractionated into cracked naphtha, cycle oil, and decant oil. The naphtha cuts are combined, hydrodesulfurized, reformed, and separated into paraffinic raffinate and the aromatics-rich extract naphtha as product.

3,617,495
PROCESS FOR PRODUCTION OF OLEFINS AND ACETYLENE

Carle C. Zimmerman, Jr., Littleton, Colo., and Joe T. Kelly, deceased, late of Littleton, Colo. (by La Verne S. Kelly, executrix), assignors to Marathon Oil Company, Findlay, Ohio

Filed Apr. 25, 1969, Ser. No. 821,164
Int. Cl. C10g *31/00*
U.S. Cl. 208—80 **10 Claims**

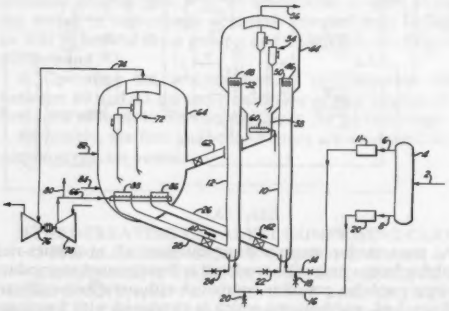


Ethylene, acetylene, and petroleum coke are manufactured by distilling a crude oil to produce a more volatile straight run naphtha and a less-volatile reduced crude oil; feeding the straight run naphtha to a hydrocarbon pyrolysis furnace to produce products comprising acetylene, ethylene, and hydrogen; coking the reduced crude to produce petroleum coke and a coker naphtha; separating a portion of the hydrogen from the hydrocarbon pyrolysis furnace effluent; using a portion of the hydrogen to hydrotreat the coker naphtha so as to produce hydrotreated oils having a substantially lower aromatic and olefin content than the coker naphtha; and feeding a portion of the hydrotreated oils into the hydrocarbon pyrolysis furnace.

3,617,496
FLUID CATALYTIC CRACKING PROCESS WITH A SEGREGATED FEED CHARGED TO SEPARATE REACTORS

Millard C. Bryson, Conway, Pa., and James R. Murphy, Huntington Station, N.Y., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed June 25, 1969, Ser. No. 836,382
Int. Cl. C01b *33/28;* **C10g** *11/18, 11/20*
U.S. Cl. 208—80 **11 Claims**

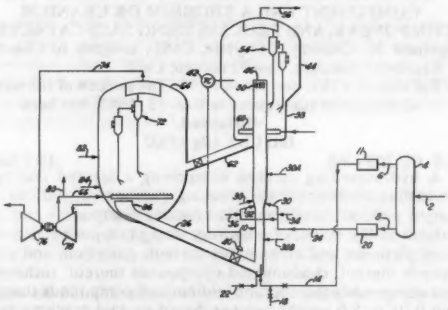


A total hydrocarbon feed is segregated into relatively low and high molecular weight fractions and the fractions are charged to separate reactors. The fraction in each reactor is cracked in the presence of a fluid zeolite catalyst or a catalyst of comparable activity and/or selectivity which produces a transient maximum gasoline yield at a residence time of 5 seconds or less and in the presence of a diluent vapor or vapors which lower the partial pressure of the hydrocarbon feed and increase gasoline selectivity. Residence time in each reactor is established by controlling the total charge rate of hydrocarbon and diluent vapor to the reactor. The ratio of diluent vapor or vapors to hydrocarbon feed in each reactor is also controlled so that a greater yield of gasoline is recovered from each reactor than could be recovered in the absence of the diluent vapor.

3,617,497
FLUID CATALYTIC CRACKING PROCESS WITH A SEGREGATED FEED CHARGED TO THE REACTOR

Millard C. Bryson, Conway, Pa., and James R. Murphy, Huntington Station, N.Y., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed June 25, 1969, Ser. No. 836,404
Int. Cl. C01b *33/28;* **C10g** *11/18;* **C10q** *11/20*
U.S. Cl. 208—80 **11 Claims**



A hydrocarbon is cracked in the presence of a fluid zeolite catalyst or a catalyst of comparable activity which produces a transient maximum gasoline yield at a residence time of 5 seconds of less and in the presence of a diluent vapor or vapors which lower the partial pressure of the hydrocarbon feed or feeds and increase gasoline selectivity. Residence time is established by controlling the total charge rate of hydrocarbons and diluent vapors. The ratio of diluent vapors to hydrocarbon feed is also controlled so that a greater yield of gasoline is recovered from the process than could be recovered in the absence of the diluent vapor or Vapors. Gasoline yield is further enhanced by segregating the hydrocarbon feed and charging the relatively lower molecular weight feed fraction or fractions near the bottom of an elongated riser or transfer line rector and the relatively higher molecular weight feed fraction or fractions progressively further up the riser or transfer line.

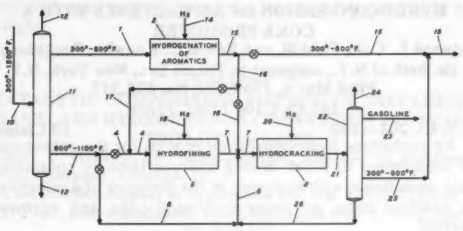
3,617,498
CATALYTIC HYDROCRACKING PROCESS

James R. Kittrell, El Cerrito, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed June 2, 1969, Ser. No. 829,174
Int. Cl. C10g *13/02, 23/00, 37/06*
U.S. Cl. 208—80 **1 Claim**

In a process wherein jet fuels and gasoline are produced from hydrocarbons boiling in the range 300° to 1,500° F., including substantial quantities of hydrocarbons boiling in the range 300° to 650° F. and substantial quantities of heavier hydrocarbons boiling in the range 550° to 1,100° F., by process steps including catalytic hydrocracking, the improvement which comprises catalytically hydrocracking said hydrocarbons boiling in the range 550° to 1,100° F., and

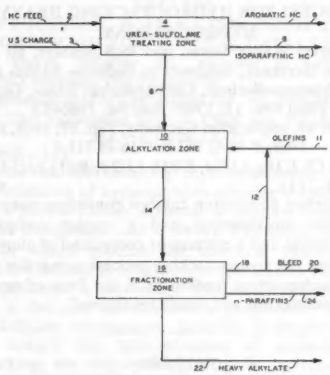
catalytically hydrogenating said hydrocarbons boiling in the range 300° to 650° F. prior to making use of said hydrocarbons boiling in the range 300° F. to 650° F. for jet fuel or for hydrocracking feedstock.



3,617,499
PROCESS FOR THE MANUFACTURE OF HIGH-PURITY N-PARAFFINS

Donald M. Little, Bartlesville, Okla., assignor to Phillips Petroleum Company

Filed Dec. 18, 1969, Ser. No. 886,299
Int. Cl. C10g *29/22*; C07c *9/14*
U.S. Cl. 208—85 **3 Claims**



A process for the manufacture of high-purity n-paraffins from mixed straight and branched chain hydrocarbons achieved through a primary adduction step followed by alkylation.

3,617,500
HYDROCONVERSION PROCESS UTILIZING A WATER-WASHED ASPHALT FEEDSTOCK

Stanley C. Haney, Homewood, and Edward W. Remus, Buffalo Grove, both of Ill., assignors to Atlantic Richfield Company

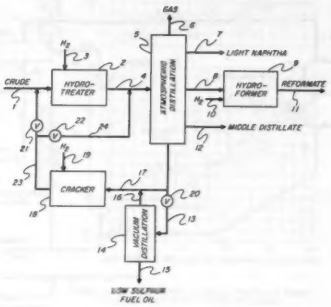
Filed Jan. 15, 1969, Ser. No. 791,498
Int. Cl. C10g *31/08*
U.S. Cl. 208—88 **12 Claims**

A process for removing water-soluble salts from asphalt by first blending the asphalt with a hydrocarbon solvent, preferably predominantly aromatic, and then washing the diluted asphalt with water. Hydroconversion, e.g. hydrocracking or desulfurization, of such desalted asphalts over a catalyst, preferably disposed as a fixed bed, results in increased maintenance of catalyst activity which eventually lines out at a higher level than catalysts employed in hydroconverting unwashed asphalts.

3,617,501
INTEGRATED PROCESS FOR REFINING WHOLE CRUDE OIL

Jackson Eng, Sarnia, and John L. Tiedje, Sarnia Township, Canada, assignors to Esso Research and Engineering Company

Filed Sept. 6, 1968, Ser. No. 757,939
Int. Cl. C10g *23/02*
U.S. Cl. 208—89 **8 Claims**

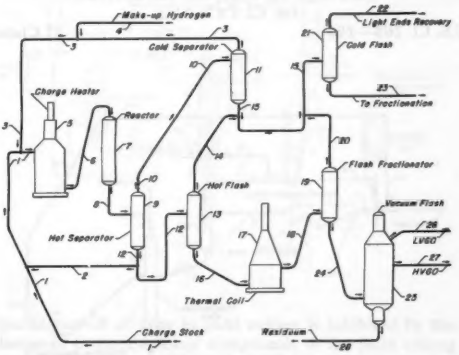


The disclosure relates to a process for the refining of whole crude oil to produce a maximum quantity of gasoline and distillate products and a minimum quantity of industrial fuel oil. The process features hydrotreating of whole crude oil as the first major processing step.

3,617,502
DESULFURIZATION AND CONVERSION OF HYDROCARBONACEOUS BLACK OILS

Frank Stolfa, Park Ridge, and Laurence O. Stine, Western Springs, both of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed Oct. 28, 1968, Ser. No. 771,250
Int. Cl. C10g *37/04*
U.S. Cl. 208—89 **8 Claims**



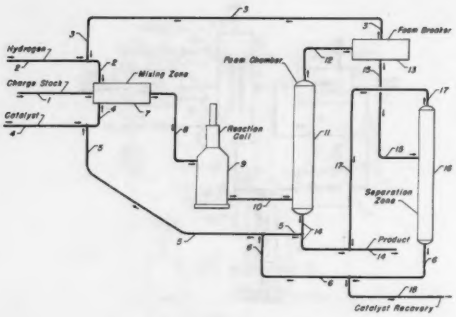
A process for converting asphaltene-containing hydrocarbonaceous black oils into lower boiling, normally liquid hydrocarbon products. The process involves the integration of a thermal cracking coil and fixed-bed catalytic hydrogenation and desulfurization, and is especially applicable to sulfurous charge stocks containing less than 150 p.p.m. of metallic contaminants, and more than about 10.0 percent by volume of nondistillables. The charge stock is initially subjected to fixed-bed catalytic desulfurization and hydrogenation, and a series of separation steps to concentrate that portion of the reaction zone product boiling at temperatures above the normal gasoline boiling range. This high-boiling concentrate is then subjected to a noncatalytic, thermal cracking reaction zone or coil.

3,617,503

SLURRY PROCESSING FOR BLACK OIL CONVERSION

Edward S. Rogers, Hinsdale, and Edward Horvath, Hickory Hills, both of Ill., assignors to Universal Oil Products Company, Des Palines, Ill.

Filed Dec. 17, 1969, Ser. No. 885,857
Int. Cl. C10g *13/00*
U.S. Cl. 208—97 6 Claims



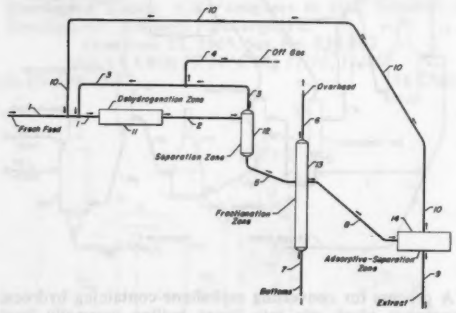
A catalytic slurry process for converting a hydrocarbonaceous charge stock containing hydrocarbon-insoluble asphaltenes. The slurry consists of the fresh feed charge stock, hydrogen, a recycled diluent boiling above about 950° F. and from 1.0 percent to about 25.0 percent by weight of finely divided catalyst particles. Separation of the catalyst, from the total reaction product, is effected through the use of a foam chamber and foam breaker. Preferred catalysts are the unsupported sulfides of the metals from Groups V–B, VI–B and VIII, with vanadium sulfide being particularly preferred.

3,617,504

PRODUCTION AND RECOVERY OF OLEFINIC HYDROCARBONS

Roy C. Berg, Park Ridge, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Sept. 22, 1969, Ser. No. 859,737
Int. Cl. C07c *5/18*
U.S. Cl. 208—100 27 Claims



A process for the production and recovery of monoolefinic hydrocarbons. A paraffinic hydrocarbon feed stream is contacted with a dehydrogenation catalyst to produce olefinic hydrocarbons with minor side-reaction product comprising primarily aromatic type hydrocarbons. The effluent material from the dehydrogenation catalyst is passed into a separation zone wherein the olefinic and aromatic hydrocarbons are separated from the unreacted paraffinic hydrocarbons. The unreacted paraffinic hydrocarbons are recycled to the dehydrogenation reactor for further production of olefinic hydrocarbons while the olefinic hydrocarbons are recovered as a relatively pure hydrocarbon extract stream.

3,617,505

HYDROCONVERSION OF ASPHALTENES WITH A COKE PROMOTER

Edward L. Cole, Fishkill, and Edwin C. Knowles, Poughkeepsie, both of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed May 6, 1969, Ser. No. 822,317
Int. Cl. C10g *13/02, 13/04*
U.S. Cl. 208—108 10 Claims

An asphaltene hydroconversion process for the conversion of asphaltenes to lower boiling hydrocarbons by contacting said asphaltenes with hydrogen in the presence of a selectively oxidized coke, an ammonia-treated coke and mixtures thereof.

3,617,506

HYDROCONVERSION PROCESS

Edward L. Cole, Fishkill, and Irving G. Schwager, Hopewell Junction, both of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed May 21, 1969, Ser. No. 826,729
Int. Cl. C10g *11/02*; B01j *11/82*
U.S. Cl. 208—108 10 Claims

An asphaltenes hydroconversion process for the conversion of asphaltenes to lower boiling hydrocarbons by contacting said asphaltenes with hydrogen in the presence of a pyrolyzed polyacrylonitrile polymer or mixtures thereof.

3,617,507

PROCESS FOR HYDROCRACKING HEAVY HYDROCARBONS

Willi Oettinger; Walter Saum, and Rolf Seubert, all of Ludwigshafen, Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen, Rhine, Germany

Filed Feb. 11, 1969, Ser. No. 798,453
Claims priority, application Germany, Feb. 17, 1968, Feb. 17, 1968; P 16 42 952.0, P 16 45 711.7
Int. Cl. C10g *13/04*; C01b *33/28*; B01j *11/54*
U.S. Cl. 208—111 5 Claims

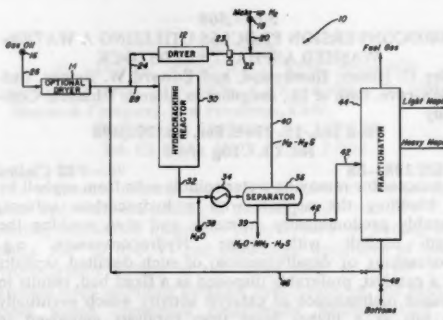
A hydrocarbon conversion catalyst consisting essentially of nickel and/or molybdenum and a carrier comprising a crystalline zeolite and a mixture or compound of alumina and magnesia, and the hydrocracking process using this catalyst and heavy hydrocarbon feedstocks in the form of crude oils, shale oils, residual oils and distillates thereof.

3,617,508

HYDROCRACKING PROCESS WITH DRYING OF HYDROGEN GAS RECYCLE

Joseph P. Gurawitz, Munster, Ind., assignor to Standard Oil Company, Chicago, Ill.

Filed Apr. 2, 1969, Ser. No. 812,695
Int. Cl. C10g *13/02, 13/04, 13/06*
U.S. Cl. 208—111 5 Claims



Low-boiling hydrocarbons from a hydrocracking reactor are treated with water to wash out ammonia and some

hydrogen sulfide. Hydrogen gas is separated from the low-boiling hydrocarbons and dried before mixing with the feed to remove any water swept up with the separated hydrogen gas. The feed may also be passed through a dryer to remove water therefrom. Catalyst deactivation is minimized with a feed-hydrogen mixture containing less than 5 p.p.m. water by weight.

3,617,509
CATALYTIC COMPOSITION, METHOD OF PREPARING SAME, AND HYDROCARBON-CONVERSION PROCESS EMPLOYING SAME

Albert L. Hensley, Jr., Munster, Ind., assignor to Standard Oil Company, Chicago, Ill.

Continuation-in-part of application Ser. No. 649,847, June 29, 1967, now abandoned. This application July 7, 1969, Ser. No. 839,692

Int. Cl. B01j *11/40;* **C10g** *13/02*

U.S. Cl. 208—111 **22 Claims**

A catalytic composition consisting essentially of an amorphous silica-alumina support having dispersed therein ultrastable, large-pore, substantially metal cation free, crystalline aluminosilicate material, a metal of Group VIA, and at least one metal of Group VIII of the Periodic Table of elements. A method of preparing this catalytic composition which comprises adding ions of the metals to a silica-alumina sol, adjusting the p^H of the composition, precipitating the sulfides of the metals, adding finely divided aluminosilicate material, drying, and calcining the resultant mixture. A hydrocarbon-conversion process employing this catalytic composition, particularly a process for hydrocracking nitrogen-contaminated hydrocarbon fluids.

3,617,510
HYDROPROCESSING WITH A GERMANIUM-RHENIUM-GROUP VIII NOBLE METAL CATALYST

John C. Hayes, Palatine, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of application Ser. No. 839,086, July 3, 1969. This application Sept. 5, 1969, Ser. No. 855,725

Int. Cl. C10g *11/02*

U.S. Cl. 208—111 **11 Claims**

A process for hydrotreating (hydroprocessing) hydrocarbons and mixtures of hydrocarbons utilizing a catalytic composite of a porous carrier material, a rhenium component, a germanium component and a Group VIII noble metal component, in which process the chemical consumption of hydrogen is effected. A specific example of one such catalyst is a composite of a crystalline aluminosilicate, particularly faujasite, a rhenium component, a germanium component and a platinum component. Specific hydroprocesses are directed toward the hydrogenation of aromatic nuclei, hydrocracking, the ring-opening of cyclic hydrocarbons for producing jet fuel components, desulfurization, denitrification and hydrogenation.

3,617,511
RING-OPENING PROCESS

John W. Jenkins, Seabrook, and Charles T. Adams, Houston, both of Tex., assignors to Shell Oil Company, New York, N.Y.

Filed Apr. 7, 1969, Ser. No. 814,521

Int. Cl. C10g *13/02;* **C07c** *5/16;* **B01j** *11/08*

U.S. Cl. 208—112 **8 Claims**

A process for conversion of cyclic hydrocarbons to paraffins wherein cyclic hydrocarbons are contacted in the presence of hydrogen with a catalyst comprising rhodium or ruthenium on a halogen promoted refractory oxide.

3,617,512
FLUID CATALYTIC CRACKING PROCESS

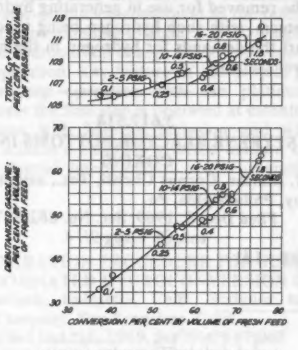
Millard C. Bryson, Conway, Pa., assignor to James R. Murphy, Huntington Station, N.Y. and Gulf Research & Development Company, Pittsburgh, Pa.

Filed June 25, 1969, Ser. No. 836,383

Int. Cl. C01b *33/28;* **C10g** *11/18, 11/20*

U.S. Cl. 208—120 **10 Claims**

A hydrocarbon feed is cracked in the presence of a fluid zeolite catalyst or a catalyst of comparable activity and/or selectivity which produces a transient maximum gasoline yield at a residence time of 5 seconds or less and in the presence of a diluent vapor or vapors which lower the partial pressure of the hydrocarbon feed and increase gasoline selectivity. Residence time is established by controlling the total charge rate of hydrocarbon and diluent vapor. The ratio of diluent vapor or vapors to hydrocarbon feed is also controlled so that a greater yield of gasoline is recovered from the process than could be recovered in the absence of the diluent vapor.


TOTAL C5+ LIQUID PER CENT BY VOLUME OF FRESH FEED
DEHYDROGENATED GASOLINE PER CENT BY VOLUME OF FRESH FEED
16-20 PSIG
10-14 PSIG
2-5 PSIG
1.0 SECONDS
CONVERSION PER CENT BY VOLUME OF FRESH FEED

EFFECT OF HYDROCARBON PARTIAL PRESSURE (PSIA) AT VARIOUS CONTACT TIMES (SECONDS)

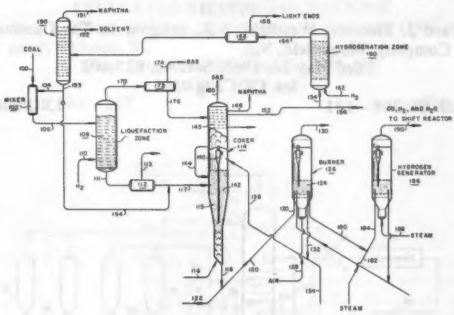
3,617,513
COKING OF HEAVY FEEDSTOCKS

Edward L. Wilson, Jr., Baytown, and Jacob B. Angelo, Houston, both of Tex., assignors to Esso Research and Engineering Company

Filed Jan. 3, 1969, Ser. No. 788,830

Int. Cl. C10g *9/32*

U.S. Cl. 208—127 **10 Claims**



The formation of char in fluid coking is inhibited by the presence of hydrogen-donor compounds in the fluid coking zone, increasing the yield of desirable liquid products. A hydrogen-donor solvent is admixed with a heavy fluid coker feedstock in amounts sufficient to provide at least 10 weight percent of hydrogen-donor compounds, based on total feed to the fluid coker. Preferable compounds for use as hydrogen donors are the partially saturated hydroaromatic compounds such as indane, C_{10}–C_{12} tetralins, C_{12} and C_{13} acenaphthenes, di-, tetra-, and octahydroanthracene, and tetrahydroacenaphthene.

The process is particularly useful in the production of liquid hydrocarbon products from solid coal wherein the coal is subjected to solvent liquefaction and the resulting liquid slurry is fed into a fluid-coking zone. Where hydrogen-donor solvent is used for the liquefaction step, and it does not become completely hydrogen-depleted, no additional solvent need be added prior to fluid coking. However, additional

hydrogen-donor solvent may be added (and if not nondonor solvent was used in liquefaction, must be added) prior to such coking. The use of additional hydrogen-donor solvent further enhances the yield of liquid products and inhibits char yield.

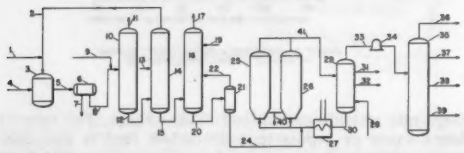
Preferably, the fluid-coking step will be used in conjunction with an external burner, and a portion of the product coke will be removed for use in generating hydrogen by contact with steam, with such hydrogen being used to satisfy at least in part the demands for hydrogen in the hydrogenation of the recycle solvent.

3,617,514

USE OF STYRENE REACTOR BOTTOMS IN DELAYED COKING

Clifford H. Marlar, Corpus Christi, Tex., assignor to Sun Oil Company, Philadelphia, Pa.

Filed Dec. 8, 1969, Ser. No. 882,867
Int. Cl. C10g *9/14*
U.S. Cl. 208—131 **5 Claims**



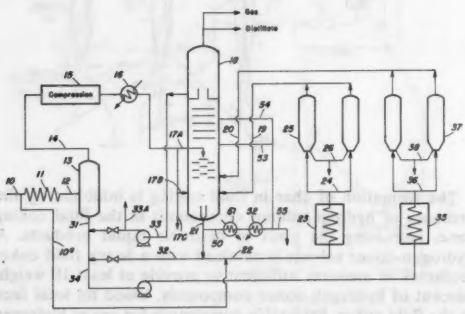
The use of heavy bottoms or styrene tar (containing sulfur and tertiary butyl catechol) from a dehydrogenation reactor for producing styrene from ethylbenzene, as part of the make up feed in a delayed petroleum coking operation. The styrene tar as obtained from the dehydrogenation reactor is mixed with a diluent such as light cycle oil, and fed to a coker along with preheated petroleum coking stock.

3,617,515

PRODUCTION OF NEEDLE COKE FROM COAL FOR PITCH

Ward J. Bloomer, Westfield, N.J., assignor to The Lummus Company, Bloomfield, N.J.

Filed May 26, 1969, Ser. No. 827,603
Int. Cl. C10g *9/14*
U.S. Cl. 208—131 **13 Claims**



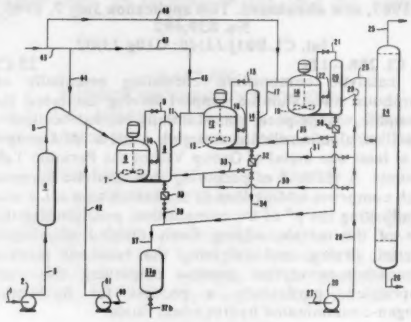
Process for producing graphitizable needle coke be delayed coking of a nonpetroleum fraction having a high content of condensed ring aromatic compounds and lower and upper cut points within the range from about 600° F. to about 1,200° F. In a preferred embodiment, the hereinabove noted fraction is separated from coal tar pitch having components boiling above 1,000° F. and the fraction boiling above 1,000° F. coked to carbon electrode grade coke.

3,617,516

PROCESS FOR THE ISOMERIZATION OF ALIPHATIC HYDROCARBONS

Gerrit Van Gooswilligen, and Heinz Voetter, both of Amsterdam, Netherlands, assignors to Shell Oil Company, New York, N.Y.

Filed Feb. 27, 1969, Ser. No. 802,978
Claims priority, application Great Britain, Mar. 29, 1968, 15225/68
Int. Cl. C10g *35/06*
U.S. Cl. 208—134 **26 Claims**



A process for isomerizing aliphatic hydrocarbons containing at least five carbon atoms per molecule and employing a hexafluoroantimonic acid catalyst wherein the catalyst deactivates slowly, which is performed by employing a partially deactivated catalyst and a small amount of benzene in the feed, and carrying out the reaction in the presence of a small amount of hydrogen.

3,617,517

HYDROFORMING CATALYST

Jay A. Rashkin, Piscataway, N.J., assignor to Cities Service Oil Company, Tulsa, Okla.

Filed June 23, 1969, Ser. No. 835,794
Int. Cl. C10g *35/06*
U.S. Cl. 208—136 **9 Claims**

A hydroforming catalyst comprising oxides of copper, nickel and molybdenum and a process for hydroforming hydrocarbon oils using such catalysts. The catalyst may also contain oxides of thorium or zirconium and is on a gamma alumina base.

3,617,518

INHIBITION OF HYDROGENOLYSIS

John H. Sinfelt, Berkeley Heights; Allan E. Barnett, Westfield, and James L. Carter, Chatham, all of N.J., assignors to Esso Research and Engineering Company

Filed June 20, 1969, Ser. No. 835,239
Int. Cl. C10g *35/06, 35/08*
U.S. Cl. 208—138 **10 Claims**

The incorporation of a Group IB metal with a Group VIII nonnoble metal or Group VIII, noble metal (Ru or Os) as a bimetallic catalyst, and possibly an alloy, results in the formation of a catalyst which, when used in a hydrocarbon conversion process, minimizes the hydrogenolysis activity of the Group VIII metal while maintaining or enhancing the catalytic activity of the Group VIII metal for conversion processes such as hydrogenation, dehydrogenation, or aromatization.

3,617,519

CONTROLLED SULFUR CONTENT IN PLATINUM-RHENIUM REFORMING

John C. Hayes, Palatine, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Jan. 29, 1969, Ser. No. 795,082
Int. Cl. C10g *35/08*
U.S. Cl. 208—139 10 Claims

A process for reforming a gasoline fraction, wherein a mixture of the gasoline fraction, hydrogen, sulfur or a sulfur-containing compound, is continuously contacted in a substantially water-free zone, with a reforming catalyst at conditions selected to produce a high-octane reformate and wherein the reforming catalyst comprises a combination of a platinum group component, a rhenium component, a halogen component, and a sulfur component with an alumina carrier material is improved by selecting the amount of sulfur or sulfur-containing compound continuously entering the reforming zone as a direct function of the atomic ratio of the platinum group metal to the rhenium metal contained in the catalyst. Key feature of the improved process involves the continuous use of sulfur in a range which is determined primary by reference to the atomic ratio of the platinum group metal to rhenium contained in the catalyst.

3,617,520

SULFIDING OF LOW PLATINUM CONTENT CATALYST

Harris E. Kluksdahl, San Rafael, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of application Ser. No. 729,079, May 14, 1968. This application June 25, 1969, Ser. No. 836,590
Int. Cl. C10g *35/08*
U.S. Cl. 208—138 6 Claims

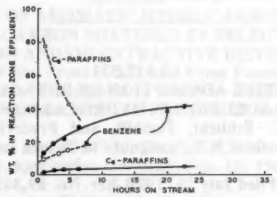
The fouling rate of a reforming catalyst comprising less than about 0.3 weight percent platinum and 0.01 to 5 weight percent rhenium in association with a porous solid carrier is significantly decreased by sulfiding the catalyst prior to reforming.

3,617,521

REFORMING PROCESS WITH A CATALYST MIXTURE

Robert J. Houston, San Rafael, and Sigmund M. Csicsery, Lafayette, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed July 11, 1969, Ser. No. 840,917
Int. Cl. C10g *35/08*
U.S. Cl. 208—138 17 Claims



A naphtha feed is reformed in the presence of hydrogen at reforming conditions with a catalyst comprising a mixture of (1) a layered crystalline clay-type aluminosilicate and (2) a platinum group component in association with a porous solid carrier.

3,617,522

CATALYTIC REFORMING OF A RELATIVELY LEAN CHARGE STOCK

Michael W. Schrepfer, Buffalo Groves, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Sept. 24, 1969, Ser. No. 860,826
Int. Cl. C10g *35/08*
U.S. Cl. 208—139 12 Claims

A relatively lean hydrocarbon charge stock boiling in the gasoline range is catalytically reformed by contacting the charge stock, hydrogen and a halogen or a halogen-containing compound, in an essentially water-free reforming zone, with a reforming catalyst containing a platinum group component and a rhenium component at reforming conditions selected to produce a high octane C_5+ reformate for a first period extending until the C_5+ volume yield decreases to an unacceptable value, and, thereafter by continuously adding water or a water-producing compound to the reforming zone in an amount corresponding to about 5 to 50 weight parts per million of the hydrocarbon charge stock while continuing the contacting operation. Key feature of the subject process involves a two-step operation with this platinum-rhenium catalyst wherein the first step is operated at essentially water-free conditions with halogen inclusion and wherein the second step utilizes a carefully selected amount of water to effect a substantial improvement in the operation of the process.

3,617,523

REGENERATION PROCEDURE FOR SULFUR-CONTAMINATED HYDROCONVERSION UNIT

Burwell Spurlock, Lafeyette, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Oct. 16, 1969, Ser. No. 867,068
Int. Cl. B01j *11/04*
U.S. Cl. 208—140 9 Claims

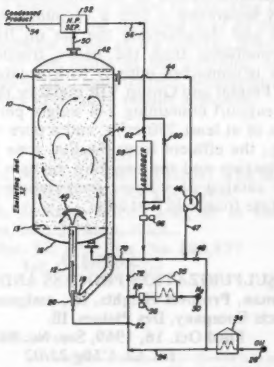
A platinum group component catalyst, used in a hydroconversion unit comprising a plurality of reactors in series, is regenerated to remove carbonaceous matter from the catalyst without contaminating the catalyst with sulfur compounds by purging the hydroconversion unit of hydrocarbons, circulating an inert gas through the hydroconversion unit at a pressure of from 50 to 1000 p.s.i.g., controlling the inlet temperature in all but the terminal reactor to below about 500° F. while controlling the inlet temperature in the terminal reactor at from 500° to 700° F., then introducing an oxygen-containing gas into the terminal reactor to remove carbonaceous matter from the catalyst but insuring that the oxygen is discontinued when the exit stream from the terminal reactor contains more than about 0.1 volume percent oxygen.

3,617,524

EBULLATED BED HYDROCRACKING

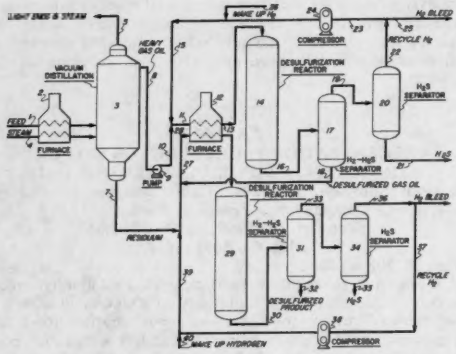
Arthur L. Conn, Chicago, Ill., assignor to Standard Oil Company, Chicago, Ill.

Filed June 25, 1969, Ser. No. 836,409
Int. Cl. C10g *13/02*
U.S. Cl. 208—157 4 Claims



Disclosed is an improved H-oil process for hydrocracking a reduced crude oil or the like. The hydrocracking is conducted in a reactor containing an ebullating bed of oil, hydrogen, and hydrocracking catalyst, and a relatively high velocity oil-gas stream is injected into the reactor. Simultaneously a portion of the reacting mass within the reactor is withdrawn and reintroduced into the reactor by mixing with the stream.

3,617,525
RESIDUUM HYDRODESULFURIZATION
Karsten H. Moritz, and Robert C. W. Welch, both of Baton Rouge, La., assignors to Esso Research and Engineering Company
Filed Apr. 3, 1969, Ser. No. 813,223
Int. Cl. C10g *23/00*
U.S. Cl. 208—211 5 Claims



An atmospheric residuum is desulfurized by first separating it into a gas oil fraction and a heavy residual fraction, desulfurizing the gas oil in the presence of hydrogen, combining the desulfurized gas oil with the heavy residual fraction and hydrodesulfurizing the mixture.

3,617,526
HYDRODESULFURIZATION OF A VACUUM GAS OIL AND VACUUM RESIDUUM
William R. Coons, Jr., Groves; Gerald V. Nelson, Nederland, Tex., and Glenn C. Wray, Dyersburg, Tenn., assignors to Texaco Inc., New York, N.Y.
Continuation-in-part of application Ser. No. 689,825, Dec. 12, 1967. This application Sept. 5, 1969, Ser. No. 855,756
Int. Cl. C10g *23/00, 23/02*
U.S. Cl. 208—211 4 Claims

Hydrodesulfurization of an atmospheric residuum is effected by separating it into a vacuum gas oil and vacuum residuum and desulfurizing the gas oil fraction under less severe conditions than the heavy fraction. The vacuum residuum is contacted initially with a catalyst containing a Group VI metal and Group VIII metal or their sulfides on an alumina support containing 2–4 weight percent silica, a surface area of at least 250 m^2/g. and a pore volume of at least 0.6 cc./g.; the effluent from the first zone is mixed with the gas oil fraction and the resulting mixture is then contacted with the catalyst at a lower temperature than the effluent temperature from said first zone.

3,617,527
DESULFURIZATION PROCESS AND CATALYST
Lee Hilfman, Prospect Heights, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.
Filed Oct. 16, 1969, Ser. No. 867,084
Int. Cl. C10g *23/02*
U.S. Cl. 208—216 6 Claims

A desulfurization catalyst of an alumina-containing carrier material, a nickel component and a tin component. Nickel constitutes from 1.0 percent to about 10.0 percent by weight of the composite and tin from about 0.7 percent to 7.0 percent, and preferred catalysts also contain from 4.0 percent to about 30.0 percent by weight of a Group VI–B metal component. The catalyst is prepared in a manner which inhibits the formation of nickel aluminate.

3,617,528
HYDROTREATING PROCESS AND CATALYST
Lee Hilfman, Prospect Heights, Ill., assignor to Universal Oil Products Company, Des Palines, Ill.
Filed Oct. 16, 1969, Ser. No. 867,085
Int. Cl. C10g *23/02*
U.S. Cl. 208—216 7 Claims

A hydrotreating (or hydrorefining) catalyst of an alumina-containing porous carrier material, a nickel component and a phosphorous component. The catalyst contains from about 1.0 to about 10.0 percent by weight of a nickel component and from about 5.0 to about 40.0 percent by weight of a phosphorous component; preferred catalysts also contain from 4.0 to about 30.0 percent by weight of a Group VI–B metal component. The catalyst is prepared in a manner which inhibits the formation of nickel aluminate to the extent that not more than 0.1 percent by weight thereof is present in the final catalytic composite.

3,617,529
REMOVAL OF ELEMENTAL SULFUR CONTAMINANTS FROM PETROLEUM OILS
William H. Thompson, St. Louis, Mo., and Eldred E. Young, Concord, Calif., assignors to Shell Oil Company, New York, N.Y.
Filed Mar. 17, 1969, Ser. No. 808,002
Int. Cl. C10g *19/02*
U.S. Cl. 208—230 2 Claims

Elemental sulfur is separated from oil containing 0.3–5 percent elemental sulfur, the oil being used as the carrier vehicle for pipeline transportation of sulfur-oil slurries. The contaminated oil is contacted with an aqueous solution containing a mixture of sodium hydrosulfide and ammonium hydroxide; the oil phase is separated from the aqueous phase; the aqueous phase is heated at about 240° F. to form elemental sulfur and the aqueous phase is filtered after cooling to recover sulfur.

3,617,530
METALS REMOVAL FROM HEAVY HYDROCARBON FRACTIONS
Robert W. Rieve, Springfield; Harold Shalit, Drexel Hill, and John J. Rothrock, Ambler, all of Pa., assignors to Atlantic Richfield Company, New York, N.Y.
Filed Nov. 12, 1969, Ser. No. 876,052
Int. Cl. C10g *17/00, 29/00*
U.S. Cl. 208—253 19 Claims

The use of alkali or alkaline earth metals with amines or ammonia to reduce the level of metal contamination of heavy hydrocarbon fractions boiling above about 900° F. such as, tars, residua, and asphaltenes.

3,617,531
SELECTIVE ADSORPTION OF PHENOLS FROM SOLUTION IN HYDROCARBONS
Raymond C. Schlicht, Fishkill, and Frederic C. McCoy, Beacon, both of N.Y., assignors to Texaco Inc., New York, N.Y.
Filed July 29, 1970, Ser. No. 59,345
Int. Cl. C10g *17/00*
U.S. Cl. 208—263 8 Claims

Extraction of phenolic materials from hydrocarbon solutions by means of polyurethane foam.

3,617,532
HYDROTREATING PROCESS
Robert A. Plundo, Greensburg, Pa., and Bruce K. Schmid, Prarie Village, Kans., assignors to Gulf Research & Development Company, Pittsburgh, Pa.
Filed Oct. 23, 1968, Ser. No. 770,058
Int. Cl. C10g *23/02*
U.S. Cl. 208—264 5 Claims

Hydrotreating catalysts promoted with boria increase the viscosity index and decrease the iodine number of lube oil charge stocks.

3,617,533

REFINING OF HYDROCARBON WITH BORON TRIFLUORIDE

Jacobus J. Smit, Vijfhuizen, Haarlemmermeer, Netherlands, assignor to N. V. Nederlandse Raffinadery van Petroleumproducten Sparndamseweg, Haarlem, Netherlands

Filed Oct. 25, 1968, Ser. No. 770,843
Int. Cl. C10g 29/02
U.S. Cl. 208—292 7 Claims

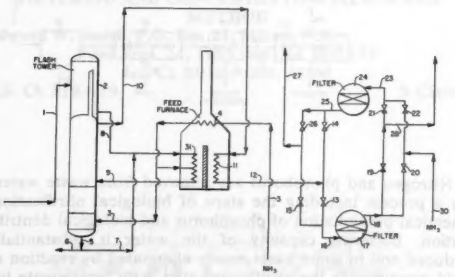
Hydrocarbon stocks containing undesirable impurities are refined by admixing between about 0.1 percent and 5 percent by weight of water with said hydrocarbon stocks and then treating said admixture with an amount of gaseous boron trifluoride in excess of that necessary for complex formation with the water. An insoluble precipitate is formed of said undesirable impurities that is readily separated from the hydrocarbon.

3,617,534

HYDROCARBON SEPARATION PROCESS

George J. Bacsik, Fanwood, N.J., assignor to Esso Research & Engineering Co.

Filed Jan. 29, 1970, Ser. No. 6,676
Int. Cl. C07c 7/12
U.S. Cl. 208—310 4 Claims



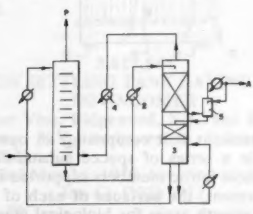
The high temperatures encountered in heating gas oil fractions containing C_{18}–C_{23} hydrocarbons for subsequent separation of the normal paraffins therefrom in a molecular sieve separation process are avoided by separating the C_{20}–C_{23} hydrocarbons as bottoms in the presence of 0.4 to 0.8 moles of ammonia per mole of feed as a stripping agent and heating the C_{19} and lower hydrocarbons in the presence of the ammonia whereby the residence time can be reduced and a maximum flashing temperature of 675° F. under 65 p.s.i.g. can be maintained to avoid cracking.

3,617,535

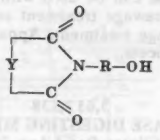
RECOVERY OF AROMATIC HYDROCARBONS FROM HYDROCARBON MIXTURES BY SELECTIVE EXTRACTION AND/OR EXTRACTIVE DISTILLATION

Hans-Martin Weitz, Frankenthal, and Ernst Fuerst, Neustadt, both of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen Rhineland, Pfalz, Germany

Filed Jan. 16, 1970, Ser. No. 3,338
Claims priority, application Germany, Jan. 18, 1969, P 19 02 461.4
Int. Cl. C10g 21/02, 2/20
U.S. Cl. 208—323 4 Claims



Recovery of aromatic hydrocarbons by selective extraction of hydrocarbon mixtures containing olefins and naphthenes in addition to aromatic and paraffinic hydrocarbons. The extractant is a mixture of an N-alkylpyrrolidone and a compound of the formula



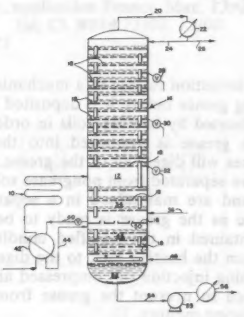
where Y is alkylene or alkenylene having two or three carbon atoms or o-phenylene which may be partially hydrogenated and R is alkylene having two to 12 carbon atoms.

3,617,536

PROCESS FOR THE DISTILLATION OF PETROLEUM CRUDE

Lonnie S. Saylor, Parsippany, N.J., and Arthur R. Campbell, Sarnia, Ontario, Canada, assignors to Esso Research and Engineering Company

Filed Mar. 11, 1969, Ser. No. 806,089
Int. Cl. B01d 3/06; C10g 7/00
U.S. Cl. 208—352 3 Claims



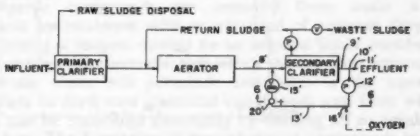
An improved process for the distillation of petroleum crude is provided in which hot bottoms liquid, remaining after flash distillation of crude in a fractionating tower, is withdrawn from the tower and passed to a cooling zone to cool the liquid to a temperature below its cracking temperature before it is returned to the stripping zone of the tower. Stripping the hot bottoms liquid at this reduced temperature, prevents cracking of the liquid in the stripping zone and avoids the formation of light ends thereby permitting bottoms product specifications to be more readily achieved.

3,617,537

BIOCHEMICAL SEWAGE TREATMENT VIA HIGH PURITY MOLECULAR OXYGEN

Floyd L. Vermette, Jackson, Mich., assignor to George E. Snyder Associates, Inc., Jackson, Mich.

Filed Mar. 12, 1969, Ser. No. 806,577
Int. Cl. C02c 1/08
U.S. Cl. 210—8 9 Claims



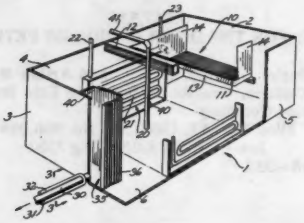
A process for improving aerobic biochemical purification of organic liquid wastes which includes dissolving high-purity

oxygen under pressure into water, and mixing the oxygen-charged water with the organic liquid wastes in one stage of treatment to increase dissolved oxygen concentration in the mixture above what it was in the organic liquid wastes before mixing. The process can be used with a lagoon method of aerobic biological sewage treatment as well as with an activated sludge sewage treatment. Apparatus is disclosed for carrying out the process.

3,617,538
GREASE DIGESTING METHOD

Ivan L. Bogert, c/o Clinton Boget Ave. 2038 Center Ave., Fort Lee, N.J.

Continuation-in-part of application Ser. No. 612,522, Jan. 30, 1967, now abandoned. This application Mar. 4, 1970, Ser. No. 16,295
Int. Cl. C02c *1/14*
U.S. Cl. 210—12 **2 Claims**

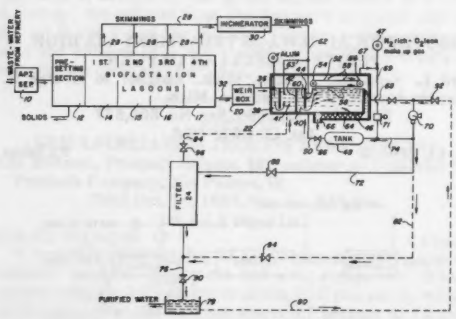


The present invention relates to a mechanism and method for conditioning grease before it is deposited into a digester. The grease is heated by heating coils in order to melt it so that when the grease is deposited into the digester, the digester enzymes will digest all of the grease. Preferably the grease solids are separated from nongrease solids prior to the melting step and are maintained in a separated condition until such time as the grease is ready to be digested. The grease is maintained in the liquified condition while it is transported from the heating tank to the digesters. Agitating means comprising injection of compressed air into the heating tank is used to prevent the grease from insulating the heating coils during melting.

3,617,539
PROCESS FOR REMOVING CONTAMINANTS FROM WASTE-WATER

James F. Grutsch, Hammond, and Russell C. Mallatt, Crown Point, both of Ind., assignors to Standard Oil Company, Chicago, Ill.

Filed May 15, 1969, Ser. No. 824,780
Int. Cl. C02c *5/06*
U.S. Cl. 210—13 **11 Claims**

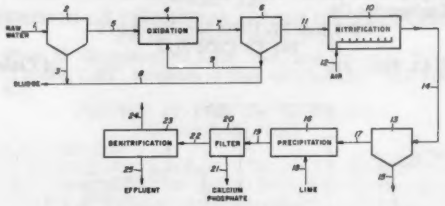


Contaminants in waste-water are removed by passing the waste-water through a biological treating zone, adding a coagulating agent to the effluent from this treating zone to coagulate into solids contaminants remaining in said effluent, and then separating the solids from the water. Separation can be achieved by either air flotation and/or filtration. Preferably, the effluent from the biological treating zone contains unflocculated biological solids which reinforce the effect of the coagulating agent.

3,617,540
REMOVAL OF NITROGEN AND PHOSPHORUS FROM WASTE WATERS

Dolloff F. Bishop, Camp Springs, and John B. Stamberg, Silver Spring, both of Md., assignors to The United States of America as represented by the Secretary of the Interior

Filed May 13, 1970, Ser. No. 36,726
Int. Cl. C02c *1/02*
U.S. Cl. 210—16 **9 Claims**

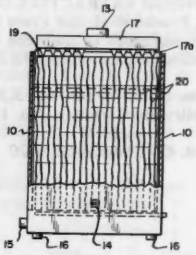


Nitrogen and phosphorus are removed from waste waters by a process including the steps of biological nitrification, chemical precipitation of phosphorus and biological dentrification. Buffering capacity of the water is substantially reduced and in some cases nearly eliminated by reaction of acid, produced in the nitrification step, with bicarbonate ion contained in the waste water. A precipitate containing phosphate in high concentration is recovered at low chemical cost.

3,617,541
BIOGRID UNIT AND METHOD

Pei Tai Pan, Beloit, Wis., assignor to Fairbanks Morse Inc., New York, N.Y.

Filed July 29, 1969, Ser. No. 845,693
Int. Cl. C02c *1/04*
U.S. Cl. 210—17 **9 Claims**



A sewage treatment unit comprising an open-ended tank including therein a series of spaced substantially vertically disposed permeable fabric members supported in the tank for oscillating movement, the surfaces of each of the members providing such growth areas for biological masses and aeration means for supplying oxygen to the biological masses to facilitate biological oxidation of the sewage in the tank.

3,617,542
REMOVAL OF PHOSPHATES FROM SEWAGE EFFLUENT

Robert A. Boehler, and Matthew R. Purvis, Jr, both of Downers Grove, Ill., assignors to Nalco Chemical Company, Chicago, Ill.

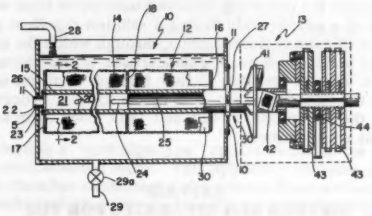
Filed Feb. 11, 1969, Ser. No. 798,449
Int. Cl. C02b *1/20*
U.S. Cl. 210—18 **9 Claims**

In sewage treatment wherein raw sewage containing phosphate is passed into a primary clarifier to remove the heavy solids and the effluent from the primary clarifier is subsequently discharged to a stream or subjected to biological secondary treatment, phosphates are removed by intimately mixing with the effluent from either primary or secondary treatment a high molecular weight, water soluble, linear, anionic polymer having a weight average molecular weight in excess of 100,000 in an amount sufficient to cause suspended solid particles, including said phosphate, to settle and increase the rate of settling, settling said solids, adding an aluminum compound to the supernatant liquid in sufficient amount to precipitate dissolved orthophosphate, and separating the settled precipitated solids along with bacteria.

3,617,543
FILTERING AND CONCENTRATING MEANS AND METHOD

Edward W. Smith, P.O. Box 21, Milton, N.H.

Filed Sept. 24, 1969, Ser. No. 860,675
Int. Cl. B01d *33/06, 35/20*
U.S. Cl. 210—19 **9 Claims**



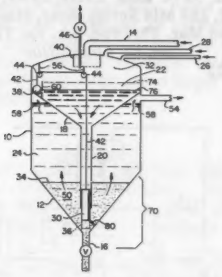
An apparatus for filtering and concentrating liquid slurries and the like is provided comprising a container having encircling filter screen mounted about an axis in a container for torsional oscillation about the axis. Means are provided for torsionally oscillating the screen with respect to the container whereby liquid is removed from a liquid particle mass in the container after it passes through the screen and the particles remain in the mass with little or no tendencies to clog the screen. The method of this invention comprises establishing a shearing action between the screen and the liquid particle mass, setting up a first liquid flow into the screen and a second pulsating liquid flow out of the screen with the second flow having predetermined peak magnitudes greater than the first flow whereby particles in the liquid mass remain in the mass and the liquid passes through the screen and is filtered.

3,617,544
HOT PROCESS SETTLING TANK HAVING ADJUSTABLE DOWNCOMER

Norbert Arthur Voss, Ridgewood, N.J., and Durando Miller, Mount Kisco, N.Y., assignors to Sybron Corporation, Rochester, N.Y.

Filed May 11, 1970, Ser. No. 36,356
Int. Cl. C02b *1/22*
U.S. Cl. 210—20 **12 Claims**

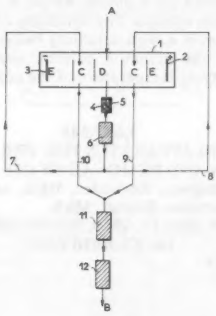
A hot process eater softener is provided with an adjustable member to provide means for extending or shortening the downcomer pipe. The adjustable member controls the point of discharge of treated water passing from the downcomer pipe into the lower settling compartment surrounding the downcomer and can be made responsive to the water level in the upper reaction compartment.



3,617,545
REMOVING UREA FROM SALINE WATER SOLUTIONS PARTICULARLY IN AN ARTIFICIAL KIDNEY

Jean-Claude Dubois, and Claude Duchesne, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Mar. 12, 1970, Ser. No. 19,018
Claims priority, application France, Mar. 13, 1969, 7130
Int. Cl. B01d *71/00, 13/00*
U.S. Cl. 210—22 **12 Claims**



Urea is removed from ultrafiltrate or dialysate by demineralizing the saline solution thereof, hydrolyzing the urea to ammonium carbonate, removing the carbonate with a cationic exchange resin and then remineralizing the resulting solution. An electrodialyzer for employing this method is described.

3,617,546
REMOVAL OF ORGANIC COMPOUNDS BY LIQUID MEMBRANE

Norman N. Li, Edison; Robert P. Cahn, Millburn, and Adam L. Shrier, Upper Montclair, all of N.J., assignors to Esso Research and Engineering Company

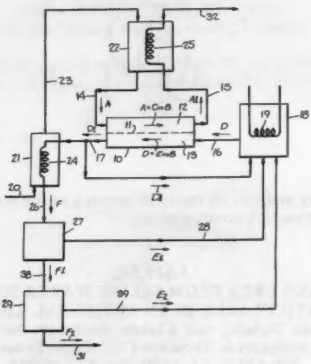
Filed Apr. 13, 1970, Ser. No. 28,094
Int. Cl. B01d *13/00*
U.S. Cl. 210—22 **13 Claims**

Organic compounds are removed from waste water streams by treatment with an emulsion of aqueous droplets containing a reagent coated by an organic liquid membrane containing surfactants through which the organic compounds in waste water will permeate and react in the aqueous droplets to form new chemical compounds and from which they can be recovered eventually by flashing off or emulsion breakup. The formation of new chemical compounds in the aqueous droplets prevents the organic compounds from permeating out of the emulsion. In a preferred embodiment of the invention phenol is removed from waste water streams.

3,617,547
PROCESS FOR OSMOTICALLY DECREASING THE CONCENTRATION OF A SOLUTE

Albert H. Halff, 3574 Rock Creek Drive, Dallas, Tex., and Allen F. Reid, 258 Mill Spring Road, Manhasset, N.Y.

Filed Mar. 19, 1968, Ser. No. 714,179
Int. Cl. B01d *13/00*
U.S. Cl. 210—22 16 Claims

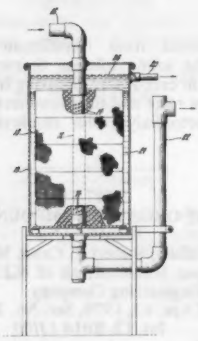


The process comprises the transfer of a common solvent through a permeable membrane from a donor solution with a difficult to separate solute to a recipient solution having an osmolality provided by a solute which is readily separated from the common solvent. The solubility of the solute of the recipient solution is a high solubility below the vaporization temperature of the common solvent and a low solubility above the solidifying temperature of the common solvent.

3,617,548
METHOD AND APPARATUS FOR THE CONTINUOUS SEPARATION AND REMOVAL OF OIL FROM WATER

Robert A. Willihnganz, Rochester, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed June 17, 1969, Ser. No. 834,026
Int. Cl. B01d *17/02*
U.S. Cl. 210—23 5 Claims

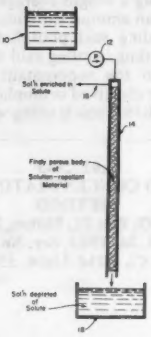


A method and apparatus for continuously separating and removing oil from a liquid of higher specific gravity. In the separation process, an immiscible mixture of oil in a liquid of higher specific gravity, such as water, is continuously passed through a knitted polyethylene, polypropylene or polyvinyl chloride packing which has an affinity for oil whereby the oil coalesces on the surface of the knitted polymer packing. The oil having a lower specific gravity than the water phase continuously rises along the surfaces of the knitted polymer packing and is released on the surface of the water phase as a layer which can be easily and continuously drawn off.

3,617,549
SEPARATION OF DISSOLVED SUBSTANCES FROM SOLUTIONS THEREOF

Edward Robbart, 321 Fairmount Ave., Milton, Mass.

Continuation of application Ser. No. 621,083, Dec. 12, 1966, now abandoned, Continuation-in-part of application Ser. No. 310,537, Sept. 23, 1963, now abandoned. This application June 27, 1969, Ser. No. 838,054
Int. Cl. B01d *13/00*
U.S. Cl. 210—23 5 Claims

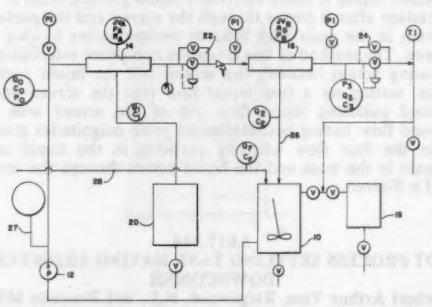


Apparatus for removing dissolved substances from solution consists of a porous body having a solution-repellent surface of e.g., a silicone of fluorocarbon, through which the solution is forced under pressure. A characteristic of the porous body is that it is more resistant to flow through it of the solution than to the flow through it of the pure solvent. Processes effecting the separation of salt and D_2O from their aqueous solutions are described.

3,617,550
METHOD AND APPARATUS FOR THE CONCENTRATION OF SOLUTIONS

Chaim Elata, Savion, and Jonatan Ben-Dror, Rehovot, both of Israel, assignors to Hydronautics-Israel Ltd., Rehovot, Israel

Filed Oct. 7, 1969, Ser. No. 864,309
Claims priority, application Israel, Apr. 4, 1969, 31963
Int. Cl. B01d *13/00*
U.S. Cl. 210—23 7 Claims



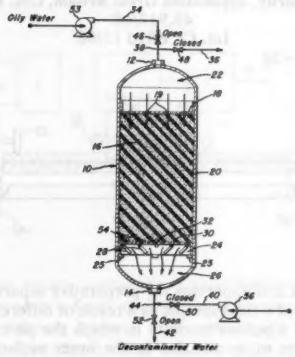
A feed solution containing a solute and a solvent is concentrated by reverse osmosis. The feed solution is subjected to a given working pressure and is first forced through a series of high rejection membranes. The diluted solution which permeates the high rejection membranes is discarded and the product solution leaving the high rejection membranes is

then passed as a feed solution through a series of low rejection membranes. The dilute solution which permeates through the low rejection membranes is preferably recycled to the starting feed solution, but can be discarded, if desired. The product comprises the concentrated solution which does not permeate the low rejection membranes. The working pressure of the solution fed to both the high rejection membrane and the low rejection membranes should exceed $R^2\pi'$ where: R is the rejection ratio of the membrane and π' is the osmotic pressure of the solution being fed to the membrane.

3,617,551
APPARATUS AND PROCESS FOR PURIFYING OIL-CONTAMINATED WATER

Walker F. Johnston, Flossmoor, Ill., and Robert G. Will, Munster, Ind., assignors to Standard Oil Company, Chicago, Ill.

Filed Mar. 18, 1970, Ser. No. 20,509
Int. Cl. B01d *23/24, 29/14*
U.S. Cl. 210—23 **3 Claims**

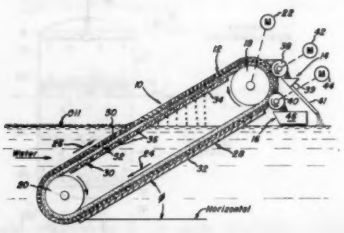


Disclosed is a "cartridge-type" apparatus useful for purifying oil-contaminated water. This apparatus includes a flow-through chamber containing polyurethane foam and a piston-like member which responds to hydraulic pressure to squeeze the foam. As oil-contaminated water flows through the chamber, oil is absorbed by the foam. Periodically, a hydraulic pressure head is established within the chamber which forces the pistonlike member to compress the foam and squeeze the oil therefrom.

3,617,552
OIL-WATER SEPARATING PROCESS

Robert G. Will, Munster, and James F. Grutsch, Hammond, both of Ind., assignors to Standard Oil Company, Chicago, Ill.

Filed Mar. 18, 1970, Ser. No. 20,510
Int. Cl. E02b *15/04;* **B01d** *23/24*
U.S. Cl. 210—23 **5 Claims**

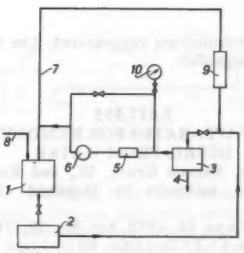


Oil-contaminated water is purified using apparatus having a revolving polyurethane foam belt which is mounted on an incline relative to the horizontal. The contaminated water moves past and through the revolving belt or the belt is mounted on a boat which moves the belt through the water. In either case, as the belt and water move relative to each other, the oil-contaminated water filters through the belt and is purified. The belt is then squeezed twice. First gently to remove water, and then vigorously to remove oil. The belt may include inner and outer abutting sections which are reinforced by a network of threads. The outer section which first contacts the contaminated water has a larger pore structure than the inner section.

3,617,553
CATALYST ULTRAFILTRATION PROCESS

Michael Thomas Westaway, Ashford, Middlesex, and Geoffrey Walker, Woking, Surrey, both of England, assignors to The British Petroleum Company Limited, London, England

Filed Mar. 7, 1969, Ser. No. 805,336
Claims priority, application Great Britain, Mar. 13, 1968, 12173/68
Int. Cl. B01d *13/00*
U.S. Cl. 210—23 **25 Claims**



Transition metal complexes are separated from mixtures containing organic components of lower molecular weight by contacting the mixture with one side of a cellulosic membrane. The applied pressure is greater than the pressure on the opposite side of the membrane and the pressure differential is greater than the osmotic pressure of the system. The permeate has a reduced concentration of complex. The membrane is preferably a cellulose acetate membrane. Applied pressures are from 500 to 2,500 p.s.i.g. and complexes separated may be those of rhodium, nickel, vanadium and other metals of groups VII A and VIII of the Periodic Table. Organic components may be hydrocarbons or mixtures from the dimerisation of olefins or from the hydroformylation of propylene.

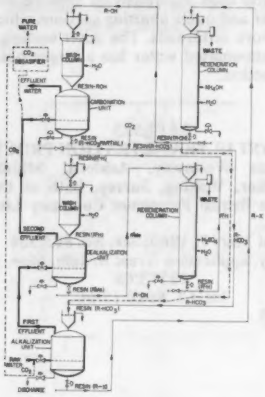
3,617,554
DESALTING AND PURIFYING WATER BY CONTINUOUS ION EXCHANGE

Charles H. Thorborg, Succasunna, N.J., assignor to Gulf Degremont, Inc., Bridgewater Township, N.J.

Division of Ser. No. 744,076, July 11, 1968. Filed June 2, 1970, Ser. No. 42,794
Int. Cl. B01d *15/02, 15/06*
U.S. Cl. 210—26 **5 Claims**

A method and apparatus are provided for the continuous treatment of brackish water, sea water, industrial wastes or sewage effluents using continuous ion exchange. Three units are provided in series, the raw water entering the first unit and purified water leaving the third unit. While the water moves continuously through the three units, an ion exchange resin is caused to flow countercurrent therethrough, a weak base anion exchange resin in the bicarbonate state passing through the first unit and the same resin, in the free base form, passing through the third unit. Passing through the

second unit countercurrent to the effluent is a weak acid cation exchange resin. After passage through the first and

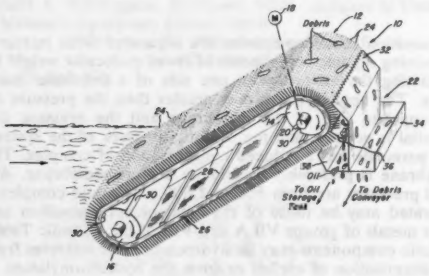


second units, the resins are regenerated. The third unit is a carbon dioxide degasifier.

3,617,555
METHOD AND APPARATUS FOR REMOVING OIL AND DEBRIS FROM WATER

Irwin Ginsburgh, Morton Grove, Ill., and Robert G. Will, Munster, Ind., assignors to Standard Oil Company, Chicago, Ill.

Filed Apr. 16, 1970, Ser. No. 29,170
Int. Cl. E02b *15/04*; B01d *33/14*
U.S. Cl. 210—30 **18 Claims**



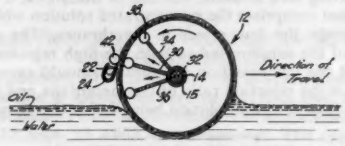
Oil and debris are removed from the surface of water using a revolving, partially submerged, endless brush belt. The brush belt has outwardly projecting bristles which ensnare the debris and pick up oil. Polypropylene bristles are preferred. The oil and debris are removed from the belt before the belt is reimmersed in the water. Alternatively, a brush-type drum could be used in place of the endless brush belt.

3,617,556
ERADICATING OIL SLICKS

Edward L. Cole, Fishkill, and Howard V. Hess, Glenham, both of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 20, 1968, Ser. No. 785,566
Int. Cl. E02b *15/04*; B01d *33/12*
U.S. Cl. 210—30 **3 Claims**

Separation and recovery of oil from oil slicks on the surface of water by continuously and selectively picking up the surface oil in a relatively thick blanket of a bulk fabric composed of highly oleophilic fibers expressing the oil from the

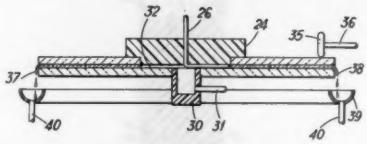


blanket and leaving the fibers in an open condition highly receptive to additional oil.

3,617,557
PREPARATIVE SEPARATION OF FLUID SAMPLES

John Giltrow, London, England, assignor to H. Reeve Angel & Company Limited, London, England

Filed Sept. 30, 1969, Ser. No. 862,300
Claims priority, application Great Britain, Oct. 15, 1968, 48,912/68
Int. Cl. B01d *15/08*
U.S. Cl. 210—31 **5 Claims**

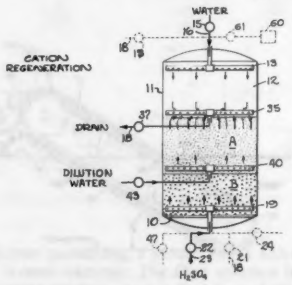


A method and apparatus for preparative separation of the components of a fluid sample as a result of differential migration through a porous medium in which the porous medium is in the form of an annulus to the inner surface of which both the fluid sample and a fluid carrier for the sample are supplied continuously and the separated components are collected continuously from the outer surface of the annulus as the result of relative rotation preferably produced by causing the annulus to rotate at a steady speed while keeping the point of application of the sample and a collection arrangement at the outer surface of the annulus stationary.

3,617,558
LAYERED ION EXCHANGE PROCESS

Gary D. Jones, Rockford, Ill., assignor to Illinois Water Treatment Co., Rockford, Ill.

Continuation-in-part of application Ser. No. 840,109, June 16, 1969, now abandoned , which is a continuation-in-part of application Ser. No. 749,819, Aug. 2, 1968, now abandoned. This application Nov. 2, 1970, Ser. No. 086,150
Int. Cl. B01d *15/06*
U.S. Cl. 210—35 **9 Claims**



In an ion exchanger having a single upright tank with upper and lower stratified beds of resins respectively adapted

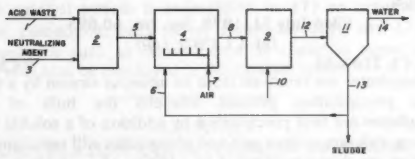
to absorbing different ions (cations or anions) of the same ionic polarity, a distributor for the inflow of water into the tank is disposed substantially at the interface between the two beds and used to effect the upward backwashing of the upper bed alone and, during regeneration of weak-and-strong-type exchange resins by the same regenerant passed successively through the beds of strong-and-weak-type resins, to dilute the regenerant to the concentration best suited for regeneration of the weak-type resin.

3,617,559

NEUTRALIZATION OF FERROUS IRON-CONTAINING ACID WASTES

Allen Cywin, Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Interior

Filed Apr. 30, 1970, Ser. No. 33,455
Int. Cl. C02c *5/04*
U.S. Cl. 210—46 **8 Claims**



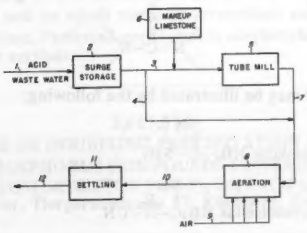
Acid waste waters containing ferrous iron are neutralized using limestone in a finely divided state. Substantial amounts of a mixed valence, hydrous iron oxide sludge are recycled back to the neutralization and aeration steps of the process to produce a dense, easily dewatered sludge having improved handling characteristics.

3,617,560

LIMESTONE NEUTRALIZATION OF DILUTE ACID WASTE WATERS

Maurice Deul, and Edward A. Mihok, both of Pittsburgh, Pa., assignors to The United States of America as represented by the Secretary of the Interior

Filed Sept. 17, 1969, Ser. No. 9,249
Int. Cl. C02c *5/04*
U.S. Cl. 210—47 **7 Claims**



Dilute acid wastes, such as mine drainage waters, are neutralized by reaction with an extremely finely divided limestone slurry after which the neutralized effluent is aerated to strip carbon dioxide and oxidize ferrous iron. After clarification, the product stream is suitable for disposal in surface waters.

3,617,561

METHOD FOR CLARIFYING LIQUIDS

John R. Fanselow, Kalamazoo, Mich., assignor to Engelhard Minerals & Chemicals Corporation, Woodbridge, N.J.

Filed July 1, 1969, Ser. No. 838,335
Int. Cl. B01d *21/01*
U.S. Cl. 210—47 **1 Claim**

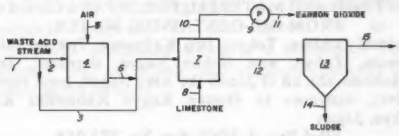
An aqueous liquid containing suspended solids is clarified by a procedure in which attapulgite clay (preferably a concentrate of the attapulgite mineral content of such clay) is initially dispersed in the aqueous suspension. Before flocs form, there is incorporated an organic polymeric polyelectrolyte which interacts in situ with the deflocculated clay material to form flocs which occlude the matter that was originally suspended in the water. The clay material is preferably subjected to intensive mechanical work in the presence of water before it is added to the liquid to be clarified.

3,617,562

NEUTRALIZATION OF FERROUS IRON-CONTAINING ACID WASTES

Allen Cywin, Alexandria, Va., and Edward A. Mihok, Pittsburgh, Pa.

Filed May 8, 1970, Ser. No. 35,866
Int. Cl. C02c *5/04*
U.S. Cl. 210—48 **16 Claims**



Ferrous iron-containing acid waste waters are neutralized to form a dense, compact, and easily settleable sludge. Ferrous to ferric iron ratios are adjusted prior to neutralization by catalytic oxidation to conform approximately to that of magnetite; $1Fe^{++}$ to $2Fe^{+++}$. Neutralization of the acid waste and precipitation of a mixed valence iron oxide is accomplished using a finely divided limestone slurry as the preferred neutralizing agent.

3,617,563

PROCESS AND A PRODUCT FOR THE PURIFICATION OF POLLUTED WATER FROM HEAVY METAL IONS PRESENT THEREIN

Kaj O. H. Fuxelius, Billingsfors, Sweden, assignor to Research Ab, Sundbyberg

Filed Aug. 12, 1969, Ser. No. 849,499
Claims priority, application Sweden, Aug. 19, 1968, 11,151/68
Int. Cl. C08g *23/10;* **B01d** *15/04*
U.S. Cl. 210—38 **6 Claims**

A product for the pruification of polluted water from heavy metal ions such as lead and mercury, present therein. The process is characterized by treating the water with an ion exchange composition on the basis of epoxidized black liquor obtained from the sulfate pulp process. The product as used for this pruification may be a reaction product of (a) black liquor, (b) epichlorohydrin or 1,2 !- dichlorohydrin and if desired (c) a thiol compound

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3,617,564

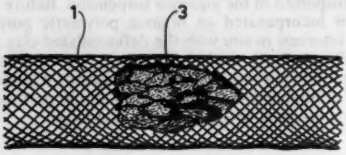
REMOVING OIL OR OIL SUBSTANCE FROM WATER AND LAND AREAS USING CORNCOB COMPONENTS

John Vander Hooven, and David I. B. Vander Hooven, both of Maumee, Ohio, assignors to Anderson Cob Mills Incorporated, Maumee, Ohio

Filed June 1, 1970, Ser. No. 42,444
Int. Cl. B01d *15/00*
U.S. Cl. 210—40 **5 Claims**

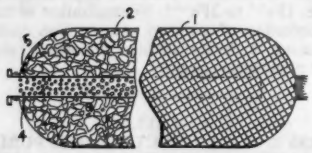
Low-density corncob meal is placed on a polluting oil deposit in a body of water or on a land area. The corncob components absorb the oil and the contaminated corncob meal is then removed from the body of water or from the land area.

3,617,565
METHOD AND MEANS FOR THE ABSORPTION OF PETROLEUM PRODUCTS
Hans Erik Fahlvik, Rudsjostrand 5F, 802 40 Gavle, Sweden
Filed May 24, 1968, Ser. No. 731,799
Claims priority, application Sweden, May 26, 1967, 7,463/67
Int. Cl. E02b 15/04
U.S. Cl. 210—40 11 Claims



The absorption of petroleum products is attained by bringing bark from trees belonging to the order Coniferae into contact with the petroleum products. The absorption facilitates the collection and removal of the products from a substrate such as a water surface or a solid base.

3,617,566
METHOD AND MATERIAL FOR SEPARATING OIL FROM OIL-CONTAINING WATER
Katsutoshi Oshima, Tokyo; Jiro Kajiyama, Tokyo; Shin Fukumoto, Tokyo, and Nobuo Nagao, deceased, late of Yokohama-shi, all of Japan (by Aiko Nagao, legal representative), assignors to Osman Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Nov. 4, 1968, Ser. No. 773,058
Claims priority, application Japan, Nov. 6, 1967, 42/70928
Int. Cl. E02b 75/04
U.S. Cl. 210—40 13 Claims



Oil is separated from oil-containing water by contacting the oil-containing water with an adsorbing material consisting mainly of atactic, noncrystalline polypropylene having a molecular weight of 10,000 to 100,000.

Straw, wood wool, or natural fibers can be used as a carrier for the atactic-noncrystalline polypropylene.

3,617,567
DESTRUCTION OF CYANIDE IN AQUEOUS SOLUTIONS
Owen Bertwell Mathre, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.
Filed May 15, 1969, Ser. No. 825,038
Int. Cl. C02c 5/04
U.S. Cl. 210—50 6 Claims

A process for the destruction of cyanide anions in aqueous solutions is provided using hydrogen peroxide and a soluble metal compound catalyst such as a soluble copper compound to increase the reaction rate. An aqueous composition containing hydrogen peroxide and the catalyst is also provided which can be added directly to the cyanide solution. The pH of the cyanide solution to be treated is adjusted with acid or base to a pH of about 8.3 to 11, the soluble metal compound catalyst is added at a level to give about 5 to 1,000 p.p.m. of catalyst, the hydrogen peroxide is added to give a molar ratio of hydrogen peroxide to cyanide anions of at least about 0.8 and the temperature of the solution is maintained within the range of about 20° to 75° C.

3,617,568
PROCESS FOR FLOCCULATING COLLOIDAL PARTICLES BY THE SEQUENTIAL ADDITION OF POLYMERS
Herman E. Ries, Jr., Chicago, Ill., assignor to Standard Oil Company, Chicago, Ill.
Filed Jan. 2, 1970, Ser. No. 460
Int. Cl. B01d 21/01
U.S. Cl. 210—53 1 Claim

The removal of colloidal particles from a colloidal system is enhanced by sequential addition of two polymeric flocculants in controlled amounts. The first has a polymeric ion form whose charge is opposite that of the colloidal particles and the second has a polymeric ion form whose charge is opposite that of the first polymeric ion. This process is particularly effective in aqueous systems and forms large, strongly bonded flocs of low density which may be readily removed by steps such as filtration of flotation.

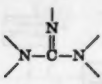
3,617,569
REMOVAL OF PHOSPHATE FROM WASTE WATER
Stacy L. Daniels, and Daniel G. Parker, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.
Filed July 31, 1970, Ser. No. 60,093
Int. Cl. C02c 1/40
U.S. Cl. 210—53 9 Claims

Phosphates are removed from an aqueous stream by a two-stage precipitation process whereby the bulk of the phosphates are first precipitated by addition of a soluble aluminum, calcium or iron salt and phosphates still remaining in solution are then precipitated by addition of a soluble lanthanide metal salt or other such salt. Separation of the precipitated phosphates is facilitated by use of a water-soluble organic anionic polyelectrolyte flocculating agent such as a partially hydrolyzed polyacrylamide.

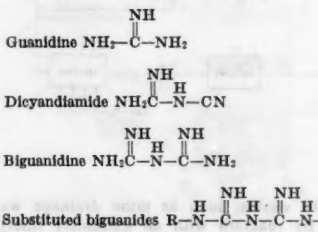
3,617,570
GUANIDINE DERIVED COMPOUNDS AS WATER CLARIFIERS
Derek Redmore, Ballwin, Mo., assignor to Petrolite Corporation, Wilmington, Del.
Division of Ser. No. 640,329, May 22, 1967, abandoned.
Filed Apr. 9, 1970, Ser. No. 27,136
Int. Cl. B01d 21/01
U.S. Cl. 210—54 10 Claims

The use as a water clarifier of the compounds formed by reacting guanidine-type compounds with polyamines. The compounds are formed by the reaction of guanidine-type compounds, (including compounds which although not guanidine-type compounds are capable of forming guanidine-type compounds).

In general, guanidine-type compounds are those which contain the



residue and may be illustrated by the following:



where at least one of the R's, which may or may not be the same, is a substituted group, for example alkyl, aryl, cycloalkyl, alkaryl, aralkyl, etc. and derivatives thereof.

An example of a compound which is not itself a guanidine type compound but is capable of forming a guanidine-type compound is cyanamide NH_2CN which reacts with itself to form dicyandiamide.

3,617,571

PROCESS OF DEMULSIFICATION WITH ULTRAHIGH MOLECULAR WEIGHT POLYOXIRANCES

Franklin E. Mange; Rudolf S. Buriks, and Allen R. Fauke, all of St. Louis, Mo., assignors to Petrolite Corporation, Wilmington, Del.

Division of Ser. No. 655,355, July 24, 1967, Pat. No. 3,532,644.
Filed Apr. 16, 1970, Ser. No. 29,268
Int. Cl. B01d *17/04*

A process of demulsifying water-in-oil emulsions, such as petroleum emulsions, which is characterized by the use of a hydrophobic ultra-high molecular weight polyoxirane; said polyoxirane being prepared by polymerizing an oxirane with a catalyst system comprising:

1. a catalyst capable of preparing ultra-high molecular weight oxirane polymers and
2. a nitro compound

The catalyst system is exemplified by (1) an organoaluminum compound, such as an aluminum-alkyl, and (2) a nitroaromatic such as nitrobenzene. A chelating agent and water may also be employed in the catalyst system.

3,617,572

FLOCCULATION AND SETTLING OF INORGANIC PARTICLES IN A SALT SOLUTION

Daniel J. Monagle, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Nov. 3, 1969, Ser. No. 873,672
Int. Cl. B01d *21/01*

U.S. Cl. 210—54 4 Claims

Predominantly inorganic water-insoluble particles suspended in aqueous salt solutions are flocculated and settled by adding to the solution a water-soluble copolymer of acrylamide and an alkali metal salt of vinyl sulfonic acid. Preferred copolymer is acrylamide—sodium vinyl sulfonate.

3,617,573

WATER-SOLUBLE COPOLYMERS IN FLOCCULATION OF INORGANIC PARTICLES

Daniel J. Monagle, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Nov. 3, 1969, Ser. No. 873,673
Int. Cl. B01d *21/01*

U.S. Cl. 210—54 3 Claims

Predominantly inorganic, water-insoluble particles suspended in aqueous salt solutions are flocculated and settled by adding to the solution a water-soluble copolymer of acrylamide and an alkali metal or ammonium salt of a sulfoalkyl acrylate. Preferred copolymer is acrylamide —sodium sulfopropllly acrylate.

3,617,574

PROCESS OF INHIBITING PRECIPITATION BY THE USE OF PHOSPHORUS COMPOUNDS CONTAINING THE ATOM SKELETON P-(C-P)$_2$ OR P-(C-P)$_3$

Ludwig Maier, Tiergartenstrasse 17, Kilchberg, Zurich, Switzerland

Division of Ser. No. 690,418, Dec. 14, 1967.
Filed Jan. 12, 1970, Ser. No. 7,429
Int. Cl. C02b *5/06*

U.S. Cl. 210—58 13 Claims

Phosphorus compounds containing the skeleton P-(C-P)$_2$ or P-(C-P)$_3$ of the formula $P(O)_a(R^1)_b[CH\ P(O)(R^2)R^3]_{3\text{-}b}$ and method for making by reacting a compound of the formula $P(O)_a(R^1)_b(CH_2Cl)_{3\text{-}b}$ with a compound of the formula $P(R^5)(R^6)OR^4$ to split off R^4Cl. Also uses of the products as threshold agents, sequestering agents, detergent composition additives, peroxy solution stabilizers and chlorine releasing agent stabilization is claimed.

3,617,575

PROCESS OF TREATING AQUEOUS SOLUTIONS WITH AN ETHANE TRIPHOSPHONIC ACID COMPOUND

Oscar T. Quimby, Colorain Township, Hamilton County, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Division of Ser. No. 602,161, Dec. 16, 1966, Pat. No. 3,551,339.
Filed Feb. 5, 1970, Ser. No. 13,224
Int. Cl. C02b *5/06*

Aqueous solutions containing polyvalent metal ions are treated by adding an effective amount of a sequestering ethane triphosphonic acid compound.

3,617,576

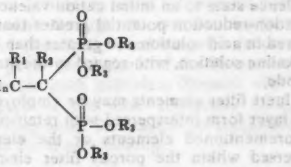
METHODS OF SCALE INHIBITION

Al F. Kerst, Littleton, Colo., assignor to Monsanto Company, St. Louis, Mo.

Filed Apr. 13, 1970, Ser. No. 27,984
Int. Cl. C02b *5/06*

U.S. Cl. 210—58 23 Claims

The precipitation of scale-forming salts in an aqueous system is inhibited by adding either stoichiometric or substoichiometric amounts to said system of an organophosphorus compound which is a substituted ethane diphosphonic acid or its salt, said organophosphorus compound having the formula



wherein R_1 and R_2 are hereinafter defined and R_n is hydrogen or a metal ion and n is an integer having a value of 1 or 2.

3,617,577

METHOD OF INHIBITING SCALE FORMATION

Thomas M. King, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Aug. 27, 1969, Ser. No. 853,552
Int. Cl. C02b *5/06*

U.S. Cl. 210—58 2 Claims

Precipitation of scale-forming alkaline earth salts in aqueous systems is inhibited by maintaining threshold concentrations of ethylene-maleic acid copolymers having molecular weights of from about 1,000 to 5,000 in the system.

3,617,578

SCALE INHIBITION AND COMPOUNDS THEREFOR

James R. Stanford, Sugar Land, and Paul G. Vogelsang, Jr., Houston, both of Tex., assignors to Nalco Chemical Company, Chicago, Ill.

Filed Nov. 25, 1969, Ser. No. 879,940The portion of the term of the patent subsequent to Nov. 11, 1986, has been disclaimed.
Int. Cl. C02b *5/06*

U.S. Cl. 210—58 15 Claims

Phosphated oxypropylated amines obtained by reacting polyphosphoric acid or phosphorus pentoxide or mixtures thereof with oxypropylated amines, with or without

neutralization, are used as scale inhibitors for calcium, barium and magnesium salts in waters.

3,617,579
PROCESS FOR THE PARTIAL DENITRIFICATION OF A DILUTE NITRATE ION SOLUTION
Frank C. Gunderloy, Jr., Santa Susana, and Cliff Y. Fujikawa, Encino, both of Calif.
Filed Dec. 31, 1969, Ser. No. 889,719
Int. Cl. C02c *5/02*
U.S. Cl. 210—59 **1 Claim**

A process for the partial denitrification of a dilute nitrate ion aqueous solution wherein the solution is treated in the presence of a catalytic quantity of cupric ion and at an initial pH between 7 and 11 with ferrous ion to thereby reduce the nitrate and partially denitrify the solution.

3,617,580
LUBRICATING OIL TREATMENT SYSTEM
Jerome Geyer, Elizabeth, and Shih-en Hu, Roselle, both of N.J., assignors to Esso Research and Engineering Company
Filed Dec. 16, 1968, Ser. No. 784,178
Int. Cl. B01d *37/00*
U.S. Cl. 210—60 **4 Claims**

A lubricating oil treatment system for internal combustion engines involves the circulation of such oil from an engine through an oil filter and returning the filtered oil to the engine. In this system, the oil filter or another chamber located either before or after the oil filter and through which the oil is circulated contains a relatively oil-insoluble solid inorganic element or particulate mixtures of two or more of such element, having an atomic number between 13 and 83, inclusive, and selected from the group consisting of Groups IIIA, IVA, VA, IB, IIB, IIIB, IVB, VB, VIB VIIB and VIII of the Periodic Table. The elements selected are those which upon being oxidized under the conditions obtained from their 0 valence state to an initial cation valence state have an E° oxidation-reduction potential greater than −0.94 volts, if measured in acid solution and greater than 0 volts, if measured in alkaline solution, with regard to the standard hydrogen electrode.

Inert filter elements may be employed within the oil filter in layer form interspersed with retained solid particles of the aforementioned elements or the elements may be interspersed within the porous filter elements such as porous paper, diatomaceous earth, kaolin, kieselguhr, cotton waste and linters, activated clay, charcoal or fuller's earth. Optionally, separate chambers containing the solid element may be inserted in the oil circulation system either before or after the oil filter. The preferred reducing elements are present conveniently in particle sizes ranging between about −4 and about 150 mesh standard Tyler screen size.

3,617,581
TREATMENT OF WATER-CONTAINING AROMATIC WASTES
Chun-Shan Wang, Midland, and James P. Easterly, Jr., Bay City, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.
Filed May 1, 1970, Ser. No. 33,926
Int. Cl. C02c *5/04*
U.S. Cl. 210—62 **9 Claims**

Carbocyclic oxyaromatic and heterocyclic contaminants such as phenols, pyridinols, benzofuran, and derivatives thereof in water are destroyed by dissolving excess alkali in the contaminated water and contacting the alkaline solution with sufficient chlorine to reduce the pH below seven.

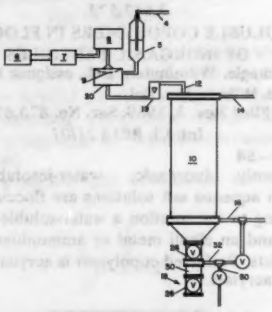
3,617,582
PROCESS FOR DETOXIFYING CYANIDE WASTE WATERS
Bernard Charles Lawes, and Owen Bertwell Mathre, both of Wilmington, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.
Filed Mar. 2, 1970, Ser. No. 15,870
Int. Cl. C02c *5/04*
U.S. Cl. 210—63 **16 Claims**

A process for detoxifying cyanide waste waters such as from cyanide electroplating rinse waters and chemical process waste waters is provided which allows the treated waste waters to be discharged to a sewer or to a solids separation step. The process uses a combination of hydrogen peroxide and formaldehyde in certain ratios and preferably a magnesium salt such as Epsom salt. Hydrogen peroxide is used in amounts so as to provide an initial molar ratio of H_2O_2/CN^1 within the range of 0.6 to 3, preferably 0.75 to 1.5 while the formaldehyde is used in amounts so as to provide an initial molar ratio of CH_20/CN^1 within the range of 0.5 to 3, preferably 0,6 to 2. When the magnesium salt is used, it is used in an amount to provide at least about 0.3 p.p.m. of Mg^{++}, preferably about 0.3 to 100 p.p.m. of Mg^{++}. It is preferred that the temperature for carrying out the process be within the range of about 50° to 180° F. and the pH of the waste waters treated be within the range of about 9 to 12.5. When zinc cyanide electroplating rinse waters are treated, the settled or filtered basic zinc salts can be recycled to the zinc electroplating step. For the first time, the process of the present invention has brought economy and efficiency to the destruction of cyanide using peroxygen compounds without the need for a catalyst.

3,617,583
PRODUCTION OF LIME
Gerald Moss, Oxford, and Geoffrey P. Richard, Didcot, both of England, assignors to Esso Research and Engineering
Filed Sept. 29, 1969, Ser. No. 862,077
Claims priority, application Great Britain, Oct. 9, 1968, 47,895/68
Int. Cl. C04b *7/44*
U.S. Cl. 263—53 R **9 Claims**

A high-sulfur fuel oil can be used for firing limestone in lime kilns. The fuel oil is passed through a fluidized bed gasifier, containing fluidized lime or limestone which reacts with sulfur in the fuel oil, and substantially sulfur-free gases pass from the gasifier to fire the lime kiln.

3,617,584
PROCESS FOR FORMING UNIFORM MICROSPHERES
Herbert P. Flack, Ellicott City; Herbert M. Katz, Silver Spring, and George E. Ashby, Highland, all of Md., assignors to W. R. Grace & Co., New York, N.Y.
Filed July 26, 1967, Ser. No. 656,266
Int. Cl. G21c *21/00*
U.S. Cl. 264—.5 **6 Claims**

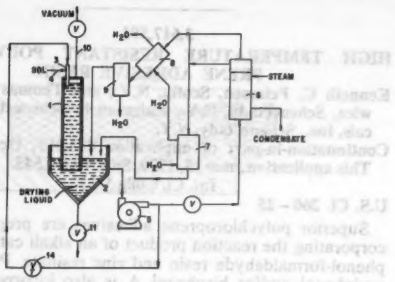


A process for preparing uniform sized microspheres of actinide, lanthanide and zirconium oxides and carbides, using sols or solutions as the feed. Uniform microspheres within a narrow size range are prepared using a vibrating diaphragm in the feed line.

3,617,585
METHOD FOR PREPARING OXIDE GEL MICROSPHERES FROM SOLS
Paul A. Haas, Knoxville, and Sam D. Clinton, Oak Ridge, both of Tenn.
Filed Sept. 23, 1969, Ser. No. 860,281
Int. Cl. G21c *21/00*
U.S. Cl. 264—0.5 **4 Claims**

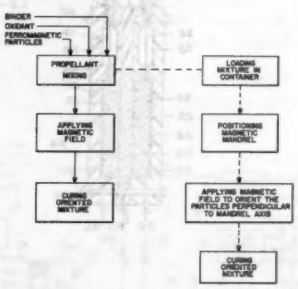
A process for the production of gel microspheres characterized by a mean sphere diameter in the range of about 5 to

300 microns and a comparatively small proportion of spheres with diameters much smaller than the mean sphere diameter. A fine stream of a hydrous sol is introduced to a dehydrating stream of organic liquid through a capillary extending into



the organic stream at an angle thereto. The flow rate of the organic stream is maintained at a value establishing a selected agitated flow condition at tee capillary outlet, thereby producing a sol drop dispersion yielding gel microspheres of the character desired.

3,617,586
BURNING RATE ACCELERATING METHOD
John M. Lenoir, Thousand Oaks, Calif.
Filed Dec. 30, 1963, Ser. No. 334,664
Int. Cl. C06b *21/02*
U.S. Cl. 264—3 C **8 Claims**

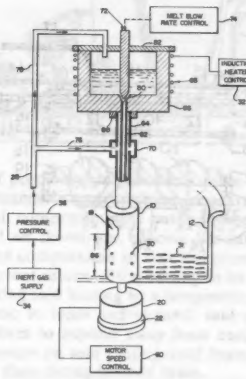


1. The method of accelerating the burning rate of a solid propellant grain, said grain consisting essentially of a cured, intimate mixture of a propellant mix consisting essentially of an uncured, liquid polymeric binder, fuel particles, and an oxidant therefor, said method comprising the steps of:

a. incorporating into said mix and uniformly distributing therethrough fine, elongated, ferromagnetic metal particles, the amount of said particles being from about 0.1 percent by weight to about 5.0 percent by weight of mix excluding the weight of said metal particles.

b. Subjecting the mix containing said metal particles to a magnetic field of sufficient strength to at least partially orient the lengthwise axis of some said metal particles substantially perpendicular to the combustion plane of said grain before said mix cures whereby upon curing of the mix said metal particles are rigidly held in the oriented position.

3,617,587
METHOD FOR PRODUCING METALLIC FILAMENTS HAVING A FORMED SKIN
Harbhajan S. Nayar, Waltham, Mass., and Walter L. Finlay, New York, N.Y., assignors to Copper Range Company, New York, N.Y.
Filed Oct. 10, 1968, Ser. No. 766,581
Int. Cl. B01j *2/04*
U.S. Cl. 264—8 **4 Claims**



Filaments composed characteristically of iron, useful for example in reinforcing concrete or the like, are produced by spinning an apertured crucible containing a melt of iron base composition, which includes a reactant agent capable of solid compound formation at the temperature of the melt, subjecting the melt to a pressure in order to cause extrusion of interrupted streams of the melt through the crucible apertures into a reactant gas, and chemically combining the reactant agent and the reactant gas at the surfaces of the filaments so formed in order to provide each individual filament with a traveling mold composed of the solid compound during solidification. This traveling mold, for example, is compatible with concrete or the like for secure bonding.

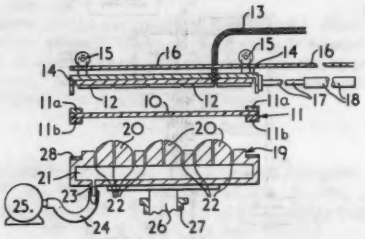
3,617,588
DIP-COATING PROCESS FOR PREPARING CELLULOSE ETHER CAPSULE SHELLS
Cyril A. J. Langman, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.
Filed June 16, 1969, Ser. No. 833,715
Int. Cl. B29c *13/00*
U.S. Cl. 264—25 **6 Claims**

The dip-coating process for preparing cellulose ether film products is improved by (A) dipping a die mandrel with an electrically conductive outer surface into an aqueous thermal gelling solution containing at least 20 wt. percent of a film-forming hydroxyalkyl alkyl cellulose ether, (B) removing the coated die mandrel from the aqueous solution, (C) rapidly converting the coating into a nonflowing cellulose ether gel by induction heating, and thereafter (D) drying the gelled coating to form a stable film product. This process is particularly useful in making water-soluble, pharmaceutical capsule shells.

3,617,589
METHOD FOR MANUFACTURING TABLE-TENNIS BALLS
James Jones-Hinton, and Thomas E. H. Gray, both of Fort Dunlop Erdington, Birmington, 24, England
Continuation-in-part of application Ser. No. 492,617, Oct. 4, 1965, now abandoned. This application Apr. 18, 1968, Ser. No. 722,436
Int. Cl. B29c *17/04*, *17/08*, *27/04*
U.S. Cl. 264—27 **18 Claims**

A method for forming table-tennis balls from a large number of thermoplastic materials including polyvinyl

chloride and terpolymers of acrylonitrile with butadiene and styrene, which includes the steps of heating a sheet of the rigid thermoplastic material until sufficiently softened, vacuum-forming the sheet into one or more hemispherical cavities of uniform wall thickness and assembling a pair of



cavities into a substantially spherical cavity. The vacuum-forming step is in two stages, partial shaping by a male or female forming tool and final shaping with a female or male forming tool. The pair of hemispherical cavities are adhered together by means of a butt-joint, with a reinforcing bead on the inside surface of the butt-joint.

3,617,590

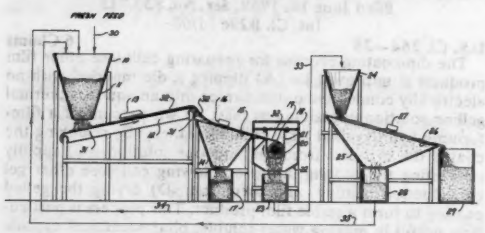
PROCESS FOR PRODUCING THERMOPLASTIC FILTER MATERIAL

Harry O. Neukomm, Sugar Loaf Lane, Wilmington, Del., and Harold E. Graham, 2415 Rambler Road, Wilmington, Del.

Filed Dec. 29, 1966, Ser. No. 605,657

Int. Cl. B29b *3/00*; B06b *1/00*

U.S. Cl. 264—37 **1 Claim**



A superior thermoplastic filter material results when the individual particles each comprise a plurality of smaller particles partially fused or sintered together. The particulate material has a low bulk density and a high surface-to-volume ratio, causes a materially lower pressure drop, and has a lower resistance to fluid flow than a material having particles of other shapes.

Such a filter material can be produced by partially fusing together thermoplastic particles of smaller size than that desired and grinding the fused particles to obtain the desired size. A preferred manner for doing this comprises forming a thin layer of particles, fusing a portion of the layer by application of heat to form a partially fused ribbon, separating the fused ribbon from the unfused particles, and grinding it to produce a filter material of the desired size.

3,617,591

HIGH TEMPERATURE RESISTANT POLYCHLOROPRENE ADHESIVE RESIN

Kenneth C. Petersen, Scotia, N.Y.; and Thomas M. Galkiewicz, Schenectady, N.Y., assignors to Schenectady Chemicals, Inc., Schenectady, N.Y.

Continuation-in-part of application 873,059, Oct. 31, 1969. This application June 15, 1970, Ser. No. 46,545

Int. Cl. C08g *5/22*

U.S. Cl. 260—25 **19 Claims**

Superior polychloroprene adhesives are prepared by incorporating the reaction product of an alkali catalyzed alkyl phenol-formaldehyde resin and zinc resinate. Preferably an arylphenol and/or bisphenol A is also incorporated. Also preferably rosin is included in the composition. Other zinc compounds, e.g., zinc oxide, zinc borate, zinc phosphate, zinc carbonate, and zinc salicylate can be used in place of zinc resinate.

3,617,592

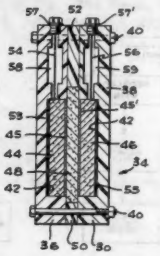
PROCESS OF FORMING A SINTERED ZINC ELECTRODE

Frank C. Arrance, Costa Mesa, and Carl Berger, Santa Ana, both of Calif., assignors to McDonnell Douglas Corporation, Santa Monica, Calif.

Filed Apr. 1, 1966, Ser. No. 539,555

Int. Cl. C04b *33/34*, *35/64*

U.S. Cl. 264—61 **4 Claims**



Production of a zinc electrode of improved strength and electrical conductivity, produced by compacting a mixture of calcined zinc oxide and zinc oxide, e.g. about 75 percent of the former and about 25 percent of the latter, sintering such compacted mixture at temperatures in excess of about 600° C. generally about 600° to about 1,450° C., and forming a strong ceramiclike zinc electrode.

3,617,593

METHOD FOR MAKING REINFORCED IGNITION-TUBE OF REINFORCED POLYURETHANE FOAM

Sterling W. Alderfer, Akron, Ohio, assignor to Teledyne, Inc., Los Angeles, Calif.

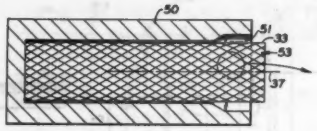
Division of Ser. No. 606,970, Jan. 3, 1967, Pat. No. 3,397,639. Filed May 1, 1968, Ser. No. 736,891

Int. Cl. B29d *27/04*

U.S. Cl. 264—45 **3 Claims**

A method of making a reinforce foam polyurethane ignition tube by selecting a length of woven polyester sleeve

which exceeds the length of the mold cavity said sleeve having a weave pattern which causes the sleeve to expand radially upon axial compression and to contract radially upon axial elongation, inserting the sleeve into a cylindrical mold cavity, axially compressing the sleeve into conformity with



the outer forming surface of the mold cavity, charging the cavity with foamable polyurethane and allowing the polyurethane to foam and unite with the sleeve. The sleeve lies contiguous with the outer surface of the tube and serves to reinforce the tube.

3,617,594

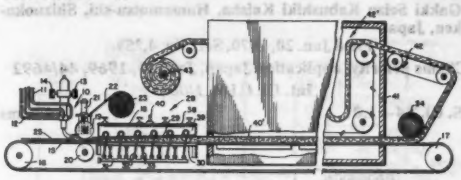
MANUFACTURE OF FOAM-FILLED SHEET PRODUCTS

John Willy, Attleboro, Mass., assignor to Specialty Converters, Inc.

Division of Ser. No. 460,929, June 3, 1965, abandoned, Continuation-in-part of application Ser. No. 444,984, Apr. 2, 1965, now abandoned. Filed June 6, 1969, Ser. No. 845,115

Int. Cl. B29d *27/04*

U.S. Cl. 264—45 4 Claims



A method of preparing polyurethane foam-filled products by adding a foamable polyurethane mixture to a fibrous batting material, compressing the batting material to remove substantially all air therefrom, placing the saturated batting under controlled compression so that the pressure thereon is sufficient to prevent return of the batting to its uncompressed state while heating said batting to a temperature sufficient to cause said plastic to foam and expand, said expansion also assisting said fibers to expand away from each other, maintaining said pressure on said batting until foaming is substantially complete, then curing foamed resin.

ELECTRICAL

3,617,595

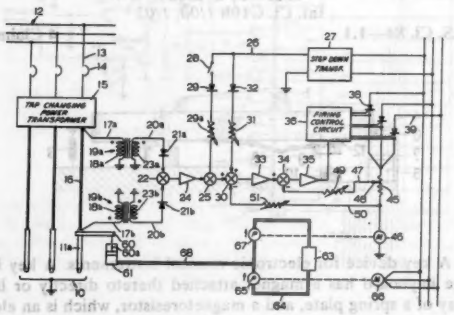
ELECTRIC FURNACE CONTROL

Joseph Aloysius Mulcahy, Brooklin, Ontario, Canada, assignor to Lake Ontario Steel Company Limited, Whitby, Ontario, Canada

Filed Sept. 17, 1970, Ser. No. 73,094

Int. Cl. F27d *11/10*

U.S. Cl. 13—13 11 Claims



A method and apparatus for regulating the arc of an electrode in an electric arc melting furnace, in which the voltage drop across the bus bar feeding the electrode is transformed into a comparator signal which is used to regulate the vertical position of the electrode in the furnace to bring the comparator signal to a predetermined value.

3,617,596

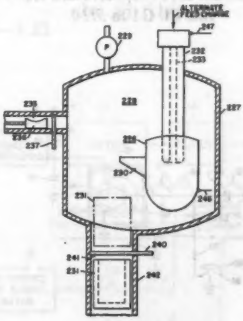
NONCONSUMABLE ELECTRODE VACUUM ARC FURNACE FOR STEEL, ZIRCONIUM, TITANIUM AND OTHER METALS

Serafino M. DeCorso, Media, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Division of Ser. No. 717,560, Apr. 1, 1968. Filed Aug. 27, 1969, Ser. No. 870,759

Int. Cl. H05b *3/60*

U.S. Cl. 13—31 3 Claims



Within a vacuum chamber or skull furnace having opening thereinto a closeable passage for a removable ingot mold there is a furnace structure not occupying the entire vacuum chamber for producing a pool of molten metal from which the ingot is to be poured, the furnace apparatus including at least one electrode with a fluid-cooled arcing surface and a magnetic field coil for substantially continuously moving the arc around the arcing surface. The skull furnace includes means for feeding material to the molten pool.

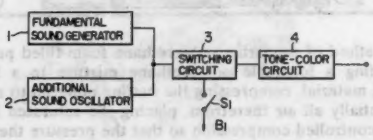
ERRATUM

For Class 75—60 see:
Patent No. 3,617,897

3,617,597
TRIANGLE SOUND SIMULATING DEVICE

Tsukasa Uba, Hamamatsu-shi, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu-shi, Shizuoka-ken, Japan

Filed Jan. 20, 1970, Ser. No. 4,259
Claims priority, application Japan, Jan. 21, 1969, 44/4692
Int. Cl. G10h *1/00*
U.S. Cl. 84—1.01 3 Claims

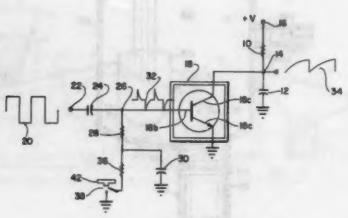


A triangle sound simulating device to be employed in an electronic musical instrument is composed of a fundamental sound signal oscillator, at least one additional sound signal oscillator for generating an additional sound signal of lower frequency than that of the fundamental sound frequency, the output level of the additional sound signal being selected to be lower than the output level of the fundamental sound signal obtained from the fundamental sound signal oscillator, and a switching circuit of nonlinear characteristic which, upon reception of the output signals can create a difference frequency sound signal of a frequency equal to the difference between those of the output signals each time the switching circuit is switched.

3,617,598
SAWTOOTH TONE GENERATING AND KEYING CIRCUIT FOR AN ELECTRONIC MUSICAL INSTRUMENT

Robert F. Woody, Jr., Christiansburg, Va., assignor to Hercules Incorporated, Wilmington, Del.

Filed Feb. 25, 1970, Ser. No. 14,070
Int. Cl. G10h *5/10*
U.S. Cl. 84—1.01 16 Claims

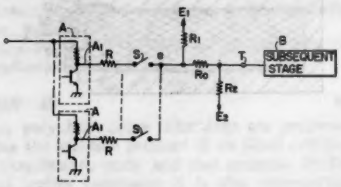


A circuit is provided for generating an output signal having the characteristics of a natural musical tone by converting a square wave input signal into a sawtooth wave output signal. The circuit includes a unidirectional current device and a biasing circuit providing a gradually changing bias voltage to the unidirectional current device. The circuit thereby produces a sawtooth wave output signal of gradually increasing and diminishing magnitude. Circuit arrangements are also provided for combining the musical tones produced by a plurality of such circuits.

3,617,599
KEYING CIRCUIT FOR ELECTRONIC MUSICAL INSTRUMENTS

Norio Tomisawa, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu-shi, Shizuoka-ken, Japan

Filed Aug. 3, 1970, Ser. No. 60,278
Claims priority, application Japan, Aug. 5, 1969, 44/74359, 44/74360, 44/74361, 44/74362; Nov. 20, 1969, 44/110254
Int. Cl. G10h *1/00*
U.S. Cl. 84—1.01 6 Claims

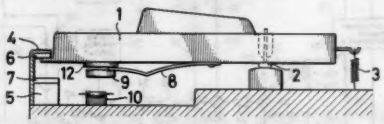


A keying circuit for electronic musical instruments in which—between a bank of keyer circuits and a subsequent circuit such as a tone-coloring circuit, a tone-mixing circuit or a tone-signal-amplifying circuit—there is provided a circuit including a resistor and a DC-bias-applying means. This arrangement may allow respective differences in DC potential between tone generators and said keyer circuits and between the latter and the subsequent circuit to be zero in direct coupling so that no DC isolation is needed which has hitherto been effected by employing capacitor-resistor coupling circuits between circuit stages. This results in acquisition of an inexpensive keying circuit.

3,617,600
MAGNETIC FIELD RESPONSIVE KEY SWITCH DEVICE FOR PRODUCING ATTACK EFFECT IN ELECTRONIC MUSICAL INSTRUMENTS

Junji Ohno, Hamamatsu-shi, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu-shi Shizuoka-ken, Japan

Filed Mar. 24, 1969, Ser. No. 809,799
Claims priority, application Japan, Mar. 30, 1968, 43/25064, 43/25065, 43/25066
Int. Cl. G10h *1/00, 1/02*
U.S. Cl. 84—1.1 4 Claims

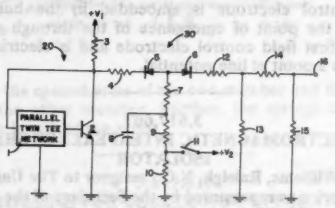


A key device for electronic musical instruments. A key in the keyboard has a magnet attached thereto directly or by way of a spring plate, and a magnetoresistor, which is an element the electric conductivity of which is controlled by the magnetic field of the magnet, is positioned at the place where the magnetic field of said magnet is applied when the key is depressed or beaten. The magnetoresistor is connected in the switching circuit of the instrument as a switch element so as to produce more voluminous sounds as said magnet comes near to said element. An elastic material such as sponge rubber of felt is mounted on the instrument beneath the key to define the lower position of the key. The combination of the spring plate attached to the key and the stop material to limit the lower position of the key makes possible an attack effect and touch-sensitive control effect during use of the keys.

3,617,601
ELECTRONIC MUSICAL TONE GENERATOR EMPLOYING PITCH COMPENSATION

Fred G. Krueger, 5051 Lindley Ave., Tarzana, Calif.

Filed May 29, 1969, Ser. No. 829,072
Int. Cl. G10h 5/00
U.S. Cl. 84—1.01 3 Claims

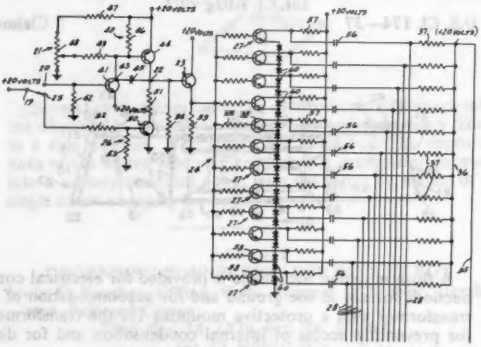


A continually operative tone oscillator has a keying network coupled to the output thereof. When the keying network is turned on, a capacitor gradually charges to a reference level. As the capacitor charges, the loading on the oscillator increases to simultaneously increase the frequency and the amplitude of the output tone. When the keying network is turned off, the capacitor discharges producing a gradual decay of the output tone. Simultaneously, the loading on the tone oscillator is decreased, thereby shifting the frequency thereof back to the original unkeyed value.

3,617,602
MUSICAL INSTRUMENT HAVING AUTOMATIC ARPEGGIO CIRCUITRY

Alberto E. Kniepkamp, Chicago, Ill., assignor to Chicago Musical Instrument Co., Lincolnwood, Ill.

Filed May 25, 1970, Ser. No. 41,149
Int. Cl. G10h 1/02
U.S. Cl. 84—1.17 26 Claims

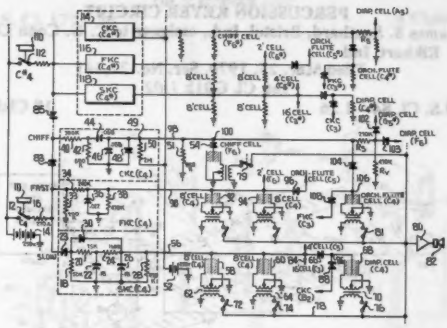


A musical instrument having a keyboard is provided with means for playing or producing an arpeggio automatically. Key switches under the control of the left-hand portion of the keyboard determine which tone producing means normally under the control of the right-hand portion of the keyboard shall be automatically actuated in sequence in the style of an arpeggio. A selectively actuatable switch is used to initiate the arpeggio and controls a triggerable circuit that provides a ramp potential for sequentially energizing the various stages of a cascade circuit that produces a series of control pulses sequentially which are directed to momentarily energize or actuate the tone producing means to make up the arpeggio.

3,617,603
CHIFF CIRCUITS FOR ELECTRONIC ORGANS

William C. Wayne, Jr., South Fort Mitchell, Ky., and Albert Meyer, Cincinnati, Ohio, assignors to D. H. Baldwin Company, Cincinnati, Ohio

Filed Mar. 23, 1970, Ser. No. 21,815
Int. Cl. G10h 3/06
U.S. Cl. 84—1.18 8 Claims

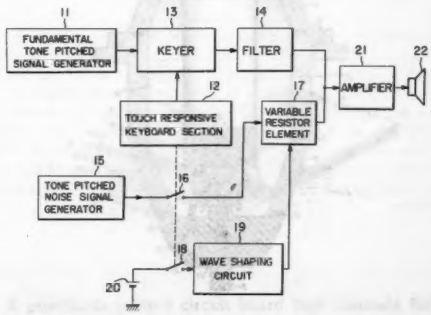


In a keyed-photocell electronic organ, two (or more) photocells are keyed with a single, make-break key switch via two (or more) respective RC keying or envelope-control circuits, one of which provides a transient keying pulse to a photocell in order to produce a chiff tone component. The chiff keying circuit includes a series capacitor, the output terminal of which is always clamped to ground by a diode circuit except for a short interval after the key switch is closed during which the level at the output terminal initially jumps and then falls off as the series capacitor charges.

3,617,604
ELECTRONIC MUSICAL INSTRUMENT CAPABLE OF GENERATING MUSICAL TONE SIGNALS SIMULATING THE SOUNDS OF A WIND INSTRUMENT

Takeshi Adachi, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu-shi, Shizuoka-ken, Japan

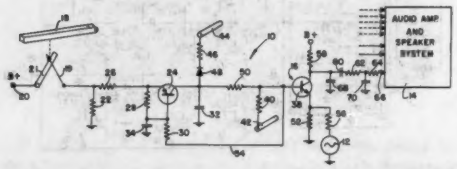
Filed Mar. 19, 1970, Ser. No. 21,079
Claims priority, application Japan, Mar. 22, 1969, 44/21426
Int. Cl. G10h 1/02
U.S. Cl. 84—1.22 16 Claims



An electronic musical instrument produces musical tones simulating a natural flute voice closely. The instrument comprises a fundamental tone-pitched signal generator, a keyer associated with a key and keying the signal from the generator with an amplitude responsive to a depressing force of the key, a filter giving a tone color, as a formant component, of

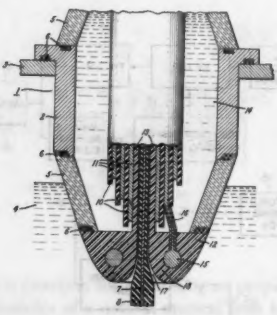
the flute voice to the keyed signal from the keyer, a tone pitched noise generator with a percussive envelope having a peak amplitude which is less responsive to the key-depressing force than the amplitude of the fundamental tone pitched signal, or not responsive to the key-depressing force. The tone signal having the flute formant and the noise signal having the pitch sense are mixed and radiated from a loudspeaker.

3,617,605
PERCUSSION KEYER CIRCUIT
James S. Southard, Bristol, Ind., assignor to C. G. Conn Ltd., Elkhart, Ind.
Filed Mar. 25, 1970, Ser. No. 22,441
Int. Cl. G01h 1/02
U.S. Cl. 84—1.26 18 Claims



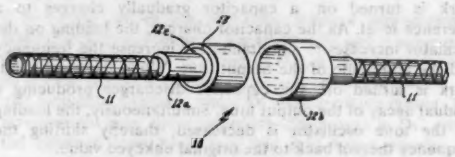
A tone generator is coupled to an audio reproducing circuit through a variable threshold gate circuit which operates in response to the actuation of a musical instrument key. Means are provided to apply a threshold voltage signal to the threshold gate circuit to initiate conduction of the gate to allow translation of the signals from the tone generator to the audio reproducing means. A current control device has its load electrodes connected between the key contactor and the input of the variable threshold gate circuit to apply an initial pulse thereto and means are provided to automatically terminate the application of such pulse whether said key contactor remains closed or is opened thereafter to simulate the percussive sound of a piano from an electronic organ.

3,617,606
SHIELDED BUSHING CONSTRUCTION
John C. Dutton, Rome, Ga., assignor to General Electric Company
Filed June 19, 1970, Ser. No. 47,742
Int. Cl. H01b 17/28
U.S. Cl. 174—31 R 10 Claims



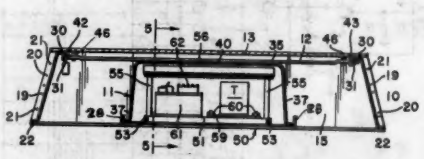
This disclosure relates to a capacitive core bushing which is adapted to be connected to a grounded, dielectric fluid filled, tank housing high voltage electrical apparatus. The bushing comprises a through conductor, a capacitive core surrounding the conductor and a housing around the core comprising upper and lower insulating shells. A conductive electrostatic field control electrode is provided, the potential of which is intermediate the line voltage and ground, located in the lower portion of the bushing, adjacent the point at which the through conductor emerges from the lower insulating shell. The field control electrode is preferably formed as a conductive ring and maintained at a selected intermediate potential by a connection to an equipotential surface of the capacitive bushing core. The field control electrode is embedded in a bushing cap of high-dielectric strength material through which the central conductor emerges at the lower end of the bushing. In a modified form a second electrostatic field control electrode is embedded in the bushing cap between the point of emergence of the through conductor and the first field control electrode and is electrically connected to a point at line potential.

3,617,607
ELECTROMAGNETIC INTERFERENCE SHIELD ISOLATOR
Jack D. Williams, Raleigh, N.C., assignor to The United States of America as represented by the Secretary of the Air Force
Filed July 10, 1970, Ser. No. 53,726
Int. Cl. H02g 15/08
U.S. Cl. 174—35 C 2 Claims



An electromagnetic interference shield isolator apparatus for coupling the shielded cables having a capacitor built into the coupler assembly to isolate the shield cables from each other with respect to both DC and RF interferences.

3,617,608
UNDERGROUND ELECTRICAL CONDUCTOR HOUSING FOR ACCOMMODATING A TRANSFORMER
Walter S. Wisniewski, Cheltenham, Pa., assignor to Repco Products Corporation, Philadelphia, Pa.
Filed Apr. 15, 1970, Ser. No. 28,846
Int. Cl. H02g 9/02
U.S. Cl. 174—37 7 Claims

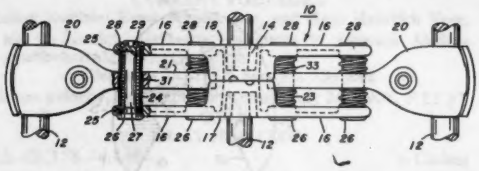


A flush-mounted receptacle is provided for electrical connections for use in the ground and for accommodation of a transformer with a protective mounting for the transformer for preventing access of internal condensation and for dissipation of heat released by the transformer.

3,617,609
CONDUCTOR VIBRATION DAMPING DEVICE
Paul D. Tuttle, Marshall, Tex., assignor to Aluminum Company of America, Pittsburgh, Pa.
Filed Nov. 19, 1970, Ser. No. 90,907
Int. Cl. H02g 7/12, 7/14
U.S. Cl. 174—42 7 Claims

A device for damping mechanical vibrations of a conductor, the device including a body member and at least one member for clamping the conductor, one of the members having opposed arms or wall structures spaced from and located respectively on at least two sides of an arm of the other member. The arms of the two members are mechani-

cally and resiliently connected together by at least two close wound springs, the longitudinal axes of the springs extending



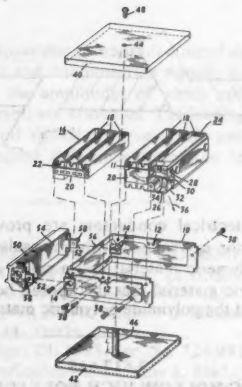
between the spaced arms of the one member and through the arm of the other member. Further, the springs are spaced along the length of the arms.

3,617,610

HOUSING FOR ELECTRONIC APPARATUS

Yasukazu Katayama; Katsuyoshi Okamoto; Hisayuki Nomura, and Akikazu Kurohara, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 28, 1970, Ser. No. 6,523
Claims priority, application Japan, Jan. 31, 1969, 44/8379
Int. Cl. H05k *5/00*
U.S. Cl. 174—50 2 Claims



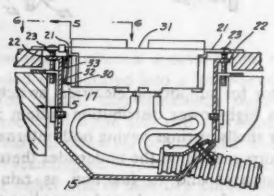
Several unit casings including electronic units respectively are disposed in side-to-side relationship and detachably fixed to a side member. Two covers are fitted onto the opposite ends of the united side member and unit casings and formed into a unitary structure along with the latter by means of a single screw engaging the covers.

3,617,611

GROUNDING CONNECTION FOR OUTLET BOX

Irwin C. Kuether, Clifton, Colo., assignor to Traylor, Harshman, Palo and Cowan

Filed Apr. 14, 1970, Ser. No. 28,402
Int. Cl. H05k *5/02*
U.S. Cl. 174—51 3 Claims



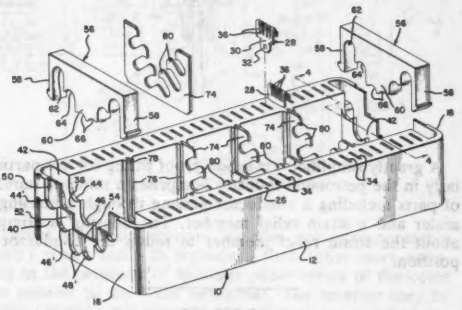
A spring metal clip mounted to connect the metal frame portion and ground terminal of an electrical receptacle unit to make spring contact with the box or may be connected to the box to make spring contact with a metal frame portion of the unit.

3,617,612

ELECTRICAL JUNCTION MEANS

George Allen Patton, Pfafftown, N.C., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Feb. 25, 1970, Ser. No. 14,130
Int. Cl. H02g *3/08*
U.S. Cl. 174—59 4 Claims



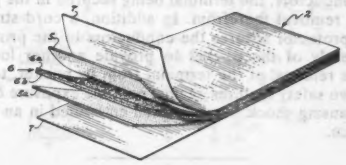
Electrical junction means comprises hollow box of insulating material having parallel relatively thick sidewalls, end walls, and cover. A plurality of terminal members are mounted on the sidewalls which are adapted to receive the conductors of cables extending through the end walls to the interior of the box. Cables are clamped by means of separate cable clamp which fits into the end walls and holds the cables between edge surfaces of the end walls and edge surfaces of the clamp.

3,617,613

PUNCHABLE PRINTED CIRCUIT BOARD BASE

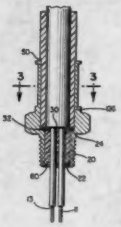
James R. Benzinger, Orchard Park, and Canisius E. Kroth, Buffalo, both of N.Y., assignors to Spaulding Fibre Company, Inc., Tonawanda, N.Y.

Filed Oct. 17, 1968, Ser. No. 768,440
Int. Cl. H05k *1/00*; B32b *3/10*
U.S. Cl. 174—68.5 8 Claims



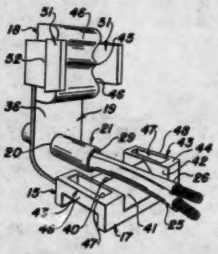
A punchable printed circuit board base laminate formed by laminating thermosetting resin impregnated woven glass fiber sheets in which the glass yarn filament diameters are between about 3 and 14 microns to the surfaces of a thermosetting resin impregnated nonwoven fiber glass core, the fibers of which have diameters in the range of 0.2 to 14 microns and lengths of between 1/32 and 1/4 inch, the laminate thickness being from 1/32 to about 3/32 of which the core thickness is about from 50 to 90 percent.

3,617,614
EXPLOSION-PROOF ELECTRICAL CONNECTOR AND CABLE ASSEMBLY
William J. Henry, Doylestown, Pa., assignor to William M. Wilson's Sons, Inc., Lansdale, Pa.
Filed Jan. 14, 1970, Ser. No. 2,839
Int. Cl. H02g 15/04
U.S. Cl. 174—77 R 1 Claim



A greatly simplified explosion-proof fitting for use particularly in the petroleum industry comprises a minimal number of parts including a conductor passing through a housing, a sealer and a strain relief member. The housing is crimped about the strain relief member to retain the conductor in position.

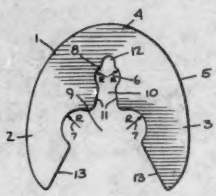
3,617,615
PROTECTOR FOR ELECTRICAL TERMINALS
Jerry L. Balzer, 7574 Carmen Drive N.W., North Canton, Ohio
Filed Jan. 19, 1970, Ser. No. 3,635
Int. Cl. H02g 15/08
U.S. Cl. 174—87 9 Claims



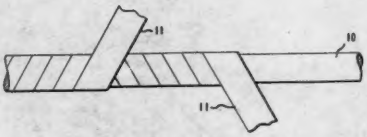
The protector has a pocket of insulating material which encloses the spliced stripped ends forming the terminal of electrical conductors, the terminal being secured in the pocket to prevent removal therefrom. In addition, a cord strain relief on the protector secures the conductors to the protector independently of the pocket to provide another lock which prevents removal of the terminal from its pocket, to thereby effect two safety features against possible exposure of the terminal causing shock hazards when embodied in an electrical appliance.

3,617,616
DUAL-WIRE CONNECTOR
Francis A. O'Loughlin, Scotch Plains, N.J., assignor to Thomas & Betts Corporation, Elizabeth, N.J.
Filed Apr. 16, 1969, Ser. No. 816,689
Int. Cl. H02g 15/08
U.S. Cl. 174—94 4 Claims

This disclosure is directed to a connector and a method for joining electrical conductors thereby. The connector may be crescent shaped with its interior arcuate walls defining two cavities for conductors separated by a rib. The connector is crimped around uninsulated portions of the wires to form an electrical and mechanical connection. The conductors may be secured into the connector seriatim or simultaneously.



3,617,617
INSULATED ELECTRICAL CONDUCTOR
Morton Katz, Columbus, Ohio, assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.
Filed June 12, 1970, Ser. No. 45,699
Int. Cl. H01 7/02, 3/30
U.S. Cl. 174—120 7 Claims



Insulated electrical conductors are provided wherein a silver conductor is wrapped with an insulation covering of polyimide polymeric material and a sulfur-containing polyimide polymeric material that is disposed between the silver conductor and the polyimide polymeric material.

3,617,618
MULTIRING HOLLOW HIGH-VOLTAGE INSULATOR WITH EXTERNAL AND INTERNAL SHEDS
Roy H. Albright, Greensburg, Pa., assignor to I-T-E Imperial Corporation, Philadelphia, Pa.
Filed Feb. 9, 1970, Ser. No. 9,821
Int. Cl. H01b 17/50, 17/60, 17/66
U.S. Cl. 174—209 6 Claims

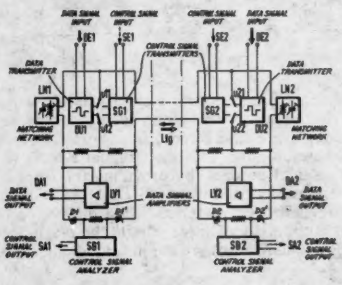
An insulator for supporting electrical switches, buses and the like in a high-power distribution system is constructed from annular shells or rings having both internal and external sheds with corrugations on the undersides thereof to increase creepage distances and to function as rain shields. The diameters of the rings are selected according to the stability required for the insulator, while the height of the individual assemblies are selected according to dielectric requirements.

3,617,619

METHOD AND APPARATUS FOR THE TRANSMISSION OF BINARY CODED DATA WITH LOW LEVEL DIRECT CURRENT VOLTAGES

Rudolf Rolther; Ernst Schuhbauer, and Hans Heinrich Voss, all of Munich, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed June 25, 1968, Ser. No. 739,682
Claims priority, application Germany, July 20, 1967, P 15 37 336.1
Int. Cl. H04l 17/00
U.S. Cl. 178—4.1 R 6 Claims



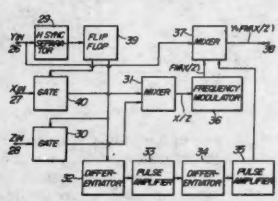
A method and apparatus to transmit control signals such as remote connection and disconnection signals, dialing signals, free signals, etc., the amplitudes of which rather than the time duration thereof, are evaluated. The leading and trailing edges of the control signals are leveled off, and the control signals are transmitted independently of the data transmission.

3,617,620

METHOD AND APPARATUS FOR TRANSMITTING OR RECORDING AND REPRODUCING LINE-SEQUENTIAL COLOR TELEVISION SIGNALS

Ichiro Arimura, Kyoto, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 29, 1968, Ser. No. 724,992
Claims priority, application Japan, May 8, 1967, July 4, 1967, Aug. 3, 1967; 42/29622, 42/43758, 42/50447
Int. Cl. H04n 9/40, 9/50
U.S. Cl. 178—5.2 R 5 Claims



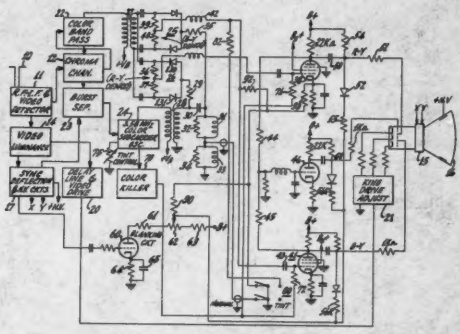
A transmission system wherein a color signal to be transmitted or recorded is separated into a luminance signal and two chrominance signals, said luminance signal is always transmitted or recorded while said two chrominance signals are line-sequentially transmitted or recorded alternately for every horizontal scanning period, and index pulses representing the scan for either one of said two chrominance signals are inserted in the horizontal synchronizing pulses contained in said luminance signal, thereby facilitating the conversion of line-sequential signals to simultaneous signals.

3,617,621

COLOR COMPENSATING CIRCUITS

Larry Allen Cochran, Indianapolis, Ind., assignor to RCA Corporation

Filed Mar. 17, 1970, Ser. No. 20,311
Int. Cl. H04n 9/12
U.S. Cl. 178—5.4 HE 12 Claims



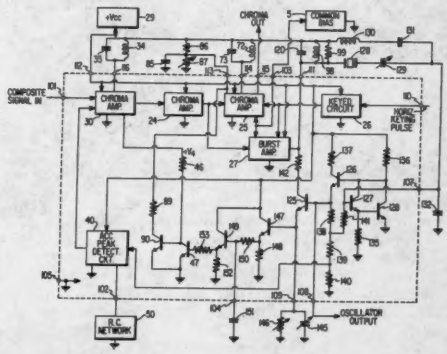
A color television receiver includes color-compensating circuitry which tends to reproduce flesh tones more accurately in the presence of spurious phase errors of the color burst relative to the color subcarrier. The receiver may be operated in the usual manner, or by throwing a switch, color compensation is achieved by causing a change in the demodulation axis of the color demodulators and simultaneously reducing the color temperature of the kinescope.

3,617,622

OSCILLATOR CIRCUITS FOR PROVIDING A VARIABLE AMPLITUDE OUTPUT SIGNAL UNDER CONTROL OF AN INJECTED INPUT SIGNAL

Leopold Albert Harwood, Somerville, N.J., assignor to RCA Corporation

Filed May 8, 1969, Ser. No. 823,066
Int. Cl. H04m 9/46
U.S. Cl. 178—5.4 SY 10 Claims

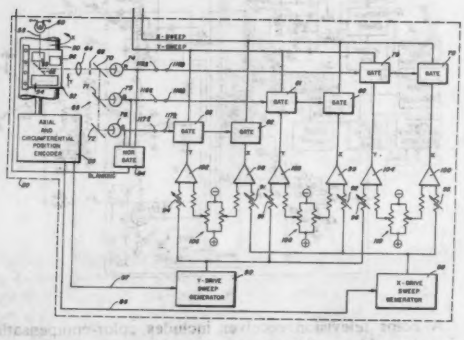


An oscillator circuit includes a first amplifier and a limiter amplifier coupled together through a filter network for supplying AC feedback thereto of a sufficient phase and magnitude to sustain oscillations. A reference signal, for phase-locking the signal of the oscillator, while varying the amplitude, is applied to the oscillator through the filter network. A passive network coupled to a separate terminal of the limiter-amplifier affords control of the peak amplitude of oscillations, while further providing a DC potential across the passive network representative of the average amplitude of the oscillatory signal.

3,617,623
APPARATUS FOR CONTROLLING PHOTOCOMPOSITION ON A CRT SCANNER

Austin Ross, Monroe, Conn., assignor to Printing Developments, Inc., New York, N.Y.

Filed Jan. 15, 1970, Ser. No. 3,118
Int. Cl. H04n 9/12
U.S. Cl. 178—5.2 A 12 Claims

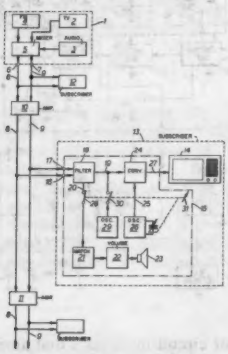


As described herein, the sweep circuits of a flying spot scanner in a photocomposition system are controlled in accordance with preselected positional and magnitudinal information signals provided by a light responsive photocomposition control circuit.

3,617,624
TELEVISION RECEIVING APPARATUS

Rupert I. Kinross, Shepperton, Middlesex, and Lionel T. Mudd, Horley, Surrey, both of England, assignors to Communications Patents Limited, London, England

Filed Sept. 4, 1968, Ser. No. 757,381
Claims priority, application Great Britain, Sept. 5, 1967, 40,467/67
Int. Cl. H04n 5/62
U.S. Cl. 178—5.8 A 3 Claims

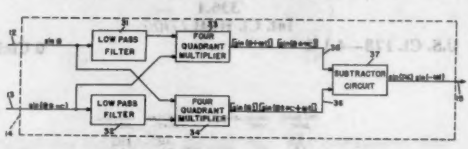


A subscriber system using an intercarrier broadcast television receiver provides for the processing of subscription signals at a different frequency range when not accompanied by a picture carrier by provision of two oscillators, one changing the subscription signals to a broadcast frequency and the other producing a carrier wave for reproduction of sound signals by the intercarrier method.

3,617,625
IMAGE CORRELATION SYSTEM

Donald C. Redpath, Winchester, Mass., assignor to Itek Corporation, Lexington, Mass.

Filed Apr. 28, 1969, Ser. No. 819,829
Int. Cl. G06f 15/34; H04n 9/56
U.S. Cl. 178—6.5 18 Claims

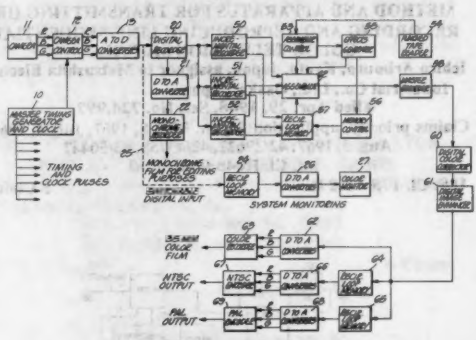


A dual image correlation system wherein a pair of video signals representing detail along corresponding paths in compared images are first filtered in low-pass filter circuits and then cross-multiplied with the original signals to produce a pair of product outputs. By providing the filter circuits with linear, frequency-dependent 0°–180° phase shift responses and sharp cutoff characteristics, the difference between the product outputs is indicative of both the magnitude and sense of image detail misregistration along the corresponding paths.

3,617,626
HIGH-DEFINITION COLOR PICTURE EDITING AND RECORDING SYSTEM

Joseph E. Bluth, North Hollywood, and Leo C. Hanseman, Burbank, both of Calif., assignors to Technicolor, Inc., Hollywood, Calif.

Filed May 16, 1969, Ser. No. 825,291
Int. Cl. G11c 27/02; H04n 5/78, 9/12
U.S. Cl. 178—6.6 A 18 Claims

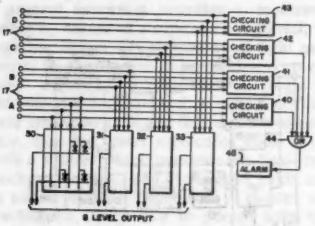


There is disclosed herein an electronic system for the production of high-definition color motion pictures for theatrical and television use. The system employs digital video techniques wherein electronic analog video color signals are digitized, and the digital signals are stored. A scene may be played back immediately during shooting for monitoring purposes or recorded subsequently on film for facilitating editing. Desired portions, such as frames or scenes, of the stored digital color picture information may be selected and assembled, and operated upon to provide special effects, to achieve suitable editing, the resulting pictures again being recorded digitally. This resulting recording may be reproduced and electronically color corrected and enhanced and then converted back to analog form for ultimate visual presentation. The analog signals may be used to generate a color film, or the digital signals before conversion may be converted to different scan standards for presentation according to various television scan standards.

3,617,627
CODE CONVERTER SUITABLE FOR USE WITH A KEYBOARD

Peter T. McLean, Des Plaines, Ill., assignor to Teletype Corporation, Skokie, Ill.

Filed May 3, 1968, Ser. No. 726,354
Int. Cl. H04l *15/12*
U.S. Cl. 178—17R **3 Claims**

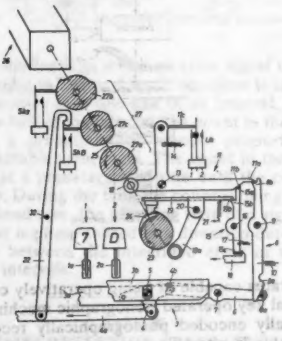


A photoelectic keyboard includes a code bar for each key, with a plurality of code bars mounted in parallel above 16 light channels. The code bars are each encoded by the presence of a single tine in one of four possible locations in each one of four fields, providing a four-out-of-16 encoding for each key. Depression of any one of the code bars then causes the light to be blocked in four out of the 16 light-carrying channels, and photo pickup cells respond to this blockage of light, providing a single output for each of the four fields. This output for each field is decoded into 2 bits of a corresponding binary character. Any time that more than 1 channel in a given field is blocked, a checking circuit, monitoring the outputs of the photocells, provides an output indicative of an error in the keyboard output.

3,617,628
ARRANGEMENT FOR AUTOMATICALLY INSERTING TYPE GROUP SHIFT SIGNALS IN KEYBOARD TRANSMITTERS

Otto Holstein, and Walter Herwig, both of Pforzheim, Germany, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Dec. 23, 1968, Ser. No. 786,162
Claims priority, application Germany, Jan. 11, 1968, P 15 62 017.4
Int. Cl. H04l *17/02*
U.S. Cl. 178—17 R **13 Claims**

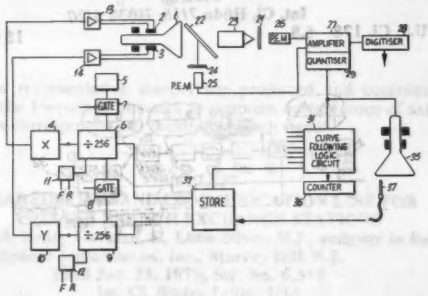


A teleprinter keyboard arrangement for automatically inserting type group shift signals. The shift signal is provided by depressing any key not included in the type group used in the previous action. The result therefrom is a change in the relative positions of two interacting bars forming a shift bar assembly. One of the bars responds and is common to all figure keys, and the other responds and is common to all letter keys. The relative change of positions of the bars disconnects the actual transmitter in favor of an auxiliary transmitter for the time required for transmission of one signal combination. The operation provided is accomplished without the aid of storage facilities.

3,617,629
PATTERN DETECTION APPARATUS

Brian Dennis McCarthy, Richmond, England, assignor to National Research Development Corporation, London, England

Filed Jan. 10, 1969, Ser. No. 790,373
Claims priority, application Great Britain, Jan. 17, 1968, 2649/68
Int. Cl. H04n *3/00*
U.S. Cl. 178—6.8 **3 Claims**

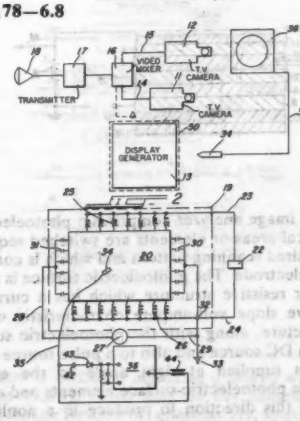


In apparatus for detecting cervical smears on microscope slides, an image of the field is scanned with a television-type scan and a detector detects any light changes caused when the scan crosses the boundary of a distinctive area. On the detection of such an area the apparatus switches to a tracing mode which traces around the area with a step-by-step motion in a series of small orthogonal steps and the coordinates of the stepping points are stored. Eventually the scan returns to its original starting point after which the television pattern scan continues until the next area is detected.

3,617,630
SUPERIMPOSED DYNAMIC TELEVISION DISPLAY SYSTEM

Leonard Reiffel, Chicago, Ill., assignor to Telestrator Industries, Inc., Chicago, Ill.

Continuation-in-part of application Ser. No. 720,130, Apr. 10, 1968, now abandoned. This application Oct. 7, 1968, Ser. No. 777,947
Int. Cl. H04n *7/18*
U.S. Cl. 178—6.8 **13 Claims**



A visual display system for superimposing linear visual images upon a dynamic television image. System covers the

use of at least two television cameras or one camera and a source of electronic background video images such as a video tape recorder, or one scene camera used in conjunction with a double-ended scan converter. One camera or the converter picks up the image from a storage device which in turn is actuated by a signal generator, said image being superimposed on the background video image.

3,617,631

IMAGE ANALYSIS SYSTEMS

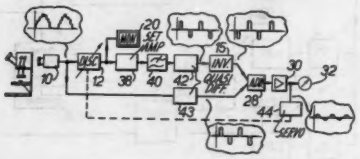
Michael Richard Soames, Cambridge, England, assignor to Metals Research Limited, Melbourn, Royston, England

Continuation of application Ser. No. 523,725, Jan. 28, 1966, now abandoned. This application Aug. 18, 1969, Ser. No. 852,972

Claims priority, application Great Britain, Feb. 6, 1965, 5256/65

Int. Cl. H04n *7/18;* **H03k** *5/20*

U.S. Cl. 178—6.8 **15 Claims**



Apparatus for the quantitative analysis of a specific part of a complete picture of specimens such as blood samples, minerals and metallurgical specimens includes means for producing a scanned electrical first video signal of the complete picture, a discriminator for isolating the portion of the first video signal corresponding to a specific part of the complete picture, and means permitting a comparison between the output from the discriminator and the first video signal for accurately setting the level of the discriminator.

3,617,632

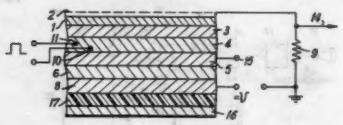
TELEVISION IMAGE ANALYZER

Valentin Fedorovich Zolotarev, K–482 Korpus 332, kv. 21; Vitaly Ivanovich Stafeev, K–482 Korpus 321, kv. 65, and Anatoly Pavlovich Budenny, ulitsa Scherbakovskaya, 16/18, kv. 218, all of, Moscow, U.S.S.R.

Filed Aug. 5, 1968, Ser. No. 750,135

Int. Cl. H04n *5/30*

U.S. Cl. 178—7.1 **10 Claims**



A television image analyzer comprises a photoelectric surface whose local areas or elements are switched sequentially to obtain a desired scanning pattern and which is coated with a translucent electrode. The photoelectric surface is arranged on a nonlinear resistive structure which has a current-controlled negative slope volt-ampere characteristic while the nonlinear structure, along with the photoelectric surface, is connected to a DC source and also to a pulse source so that a DC voltage is supplied at right angle to the excitation direction of the photoelectric-surface elements and a pulse is injected along this direction to produce in a nonlinear resistive structure a spontaneously propagating hyperconductive area which consecutively excites the elements of the photoelectric surface.

3,617,633

IMPROVEMENTS IN OR RELATING TO TELEVISION CAMERA AUTOMATIC FOCUS CONTROL SYSTEM

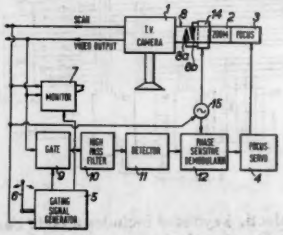
John Denzil Barr, Oadby, and Dexter Robert Plummer, Englehurst, both of England, assignors to The Rank Organisation Limited, London S.W.1, England

Filed Nov. 29, 1968, Ser. No. 779,899

Claims priority, application Great Britain, Dec. 14, 1967, 56897/67

Int. Cl. H04n *5/16*

U.S. Cl. 178—7.2 **19 Claims**



A system for automatically maintaining the focus of a television camera in which the camera focus setting is modulated, preferably at half the frame or line scan frequency, and the camera video output passed through a high pass filter to a phase-sensitive detector. The output of the detector is indicative of the magnitude and sense of the departure of the camera focus setting from sharp focus, and is used to control a focus servo.

3,617,634

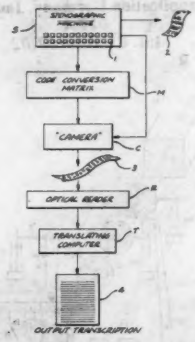
STENOGRAPHIC APPARATUS PROVIDING A PHOTOGRAPHICALLY RECORDED DIGITALLY ENCODER RECORD

Richard K. Snook, Bridgeton, and John C. Burton, St. Louis County, both of Mo., assignors to Digimetics Incorporated

Filed Sept. 17, 1969, Ser. No. 858,803

Int. Cl. H04l *17/14*

U.S. Cl. 178—15 **29 Claims**



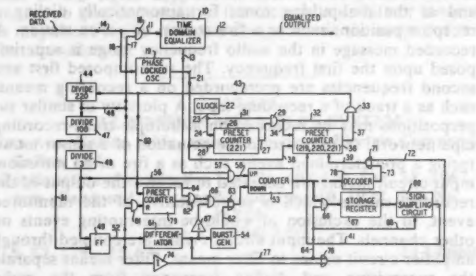
An apparatus capable of being operatively connected to a conventional key operated stenographic machine for producing a digitally encoded photographically recorded record. The apparatus is operable by actuation of the keys of the stenographic apparatus. Operation of each of the keys of the stenographic machine energizes a selected circuit of the recording apparatus and release of the key provides an advance signal to bring an unrecorded area of the photographic film into recording position. A plurality of lamp circuits are provided and will be energized by means of a code conversion matrix interposed between a suitable camera and the stenographic machine. The lamps are operatively associated

with fiber optic light guides which are located to produce an image on the photosensitive surface of the photographic film upon energization of the light source. A second pair of light paths are provided for making an exposure on each margin of the film in alignment with the data exposures so that the energization of one or more lamps represents a keyboard operation. Thus, the apparatus provides a photographic record which corresponds to the printed record of the stenographic machine and which photographic record is readable by digital computing equipment for automatically preparing a printed transcription of the record. An alternate embodiment of the present invention provides a mechanism for photorecording by means of a crystalline material, which is made to change the degree of attenuation of light passing through the material by application of an electrical current. A second alternative embodiment provides a single light source mounted beneath the keyboard. A system of fiber-optics light guides are arranged as in the first described system with this difference, that the lower surface of each key lever is provided with a shutter which prevents the light from the source from reaching the input end of the light guide associated with that key until the key is depressed. A shutter will be opened by the actuation of the key to permit light to be directed upon the input end of the selected guide or guides and to thus produce the pattern of exposure described in the preferred embodiment.

3,617,635
TIMING RECOVERY SYSTEM IN WHICH AN EQUALIZER'S SAMPLING TIME IS SET IN RESPONSE TO THE DIFFERENCE BETWEEN THE ACTUAL MEAN SQUARE ERROR AND A PREDETERMINED ACCEPTABLE ERROR

Donald Hirsch, Matawan, and Howard Clarence Meadors, Jr., Wayside, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 15, 1970, Ser. No. 37,508
Int. Cl. H04b *1/10*
U.S. Cl. 178—69 R **7 Claims**



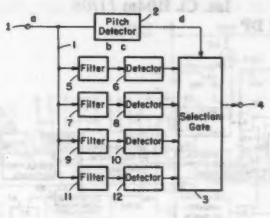
A system is disclosed in which an error signal used for adjusting tap weights in a time domain equalizer is integrated in an up-down counter over one-half of an interval. At the end of the first one-half of the interval, the count in the counter is decreased by a predetermined amount proportional to a minimum acceptable error level. The count in the counter is then reduced at a predetermined rate until the count in the counter is zero. During the time the count is being reduced at the predetermined rate, the sampling time of a signal applied to the equalizer is phase shifted in a direction determined by the difference between the integrated error in the present and preceding intervals.

3,617,636
PITCH DETECTION APPARATUS

Takashi Ogihara, Tokyo-to, Japan, assignor to Nippon Electric Company, Limited, Minato-ku, Tokyo-to, Japan

Filed Sept. 22, 1969, Ser. No. 859,800
Claims priority, application Japan, Sept. 24, 1968, 43/68952
Int. Cl. G10l *1/04*
U.S. Cl. 179—1 SA **15 Claims**

Pitch detection apparatus is disclosed in accordance with the teachings of the present invention wherein a double-pitch signal is eliminated by dividing an input speech into a plurality of frequency domains of discrete frequency ranges. The pitch frequency of the speech signal is detected and pitch

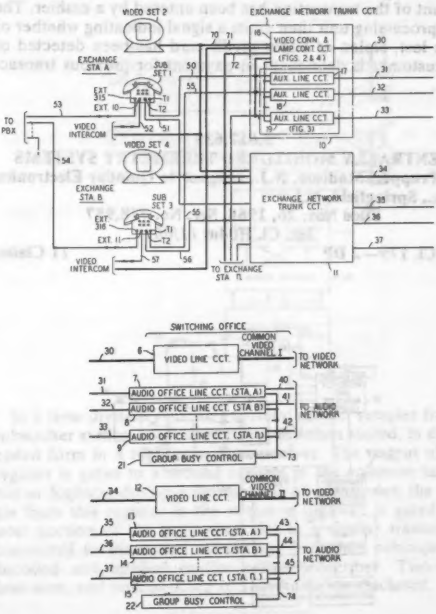


pulses representative thereof are produced and combined with the frequency domains to suppress certain ones of said pulses corresponding to the double-pitch signal.

3,617,637
SHARED WIDEBAND COMMUNICATION LINE FOR PRIVATE BRANCH EXCHANGE STATIONS

Patrick Henry Gorman, II, Little Silver, N.J., assignor to Bell Telephone Laboratories, Inc., Murray Hill, N.J.

Filed Jan. 28, 1970, Ser. No. 6,370
Int. Cl. H04m *11/06, 3/56*
U.S. Cl. 179—2 TV **16 Claims**

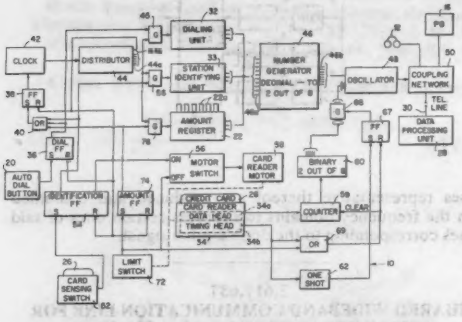


Equipment is disclosed including a shared wideband communication facility which may be key selected by private branch exchange stations or, alternatively, selected on an automatic basis to complete outgoing or incoming audio-video connections directly between line terminations of a switching office and the exchange stations.

3,617,638
SYSTEM FOR VERIFYING CREDIT CARD TRANSACTIONS

Dieter Jochimsen, Winchester, and Jurgen Kok, Bedford, both of Mass., assignors to Audac Corporation, Burlington, Mass.

Filed July 17, 1968, Ser. No. 749,557
Int. Cl. H04m *11/06*
U.S. Cl. 179—2 DP **14 Claims**

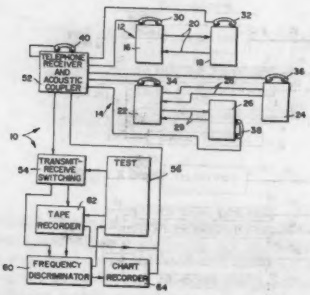


A transaction recording and verifying system employs data transmitters at remote locations where the transactions are made. Upon activation, each transmitter dials the telephone number of the data processing unit and after an acknowledgment signal has been received, it transmits over the telephone line numerical signals identifying the location of the transmitter; customer identifying signals automatically read from a credit card used in the transaction; and dollar amount signals obtained from a register into which the amount of the transaction has been entered by a cashier. The data processing unit then emits a signal indicating whether or not a lost, stolen or bogus credit card has been detected or the customer is delinquent in payment for previous transactions.

3,617,639
CENTRALLY MONITORED TELEMETRY SYSTEMS

Abe Propper, Madison, N.J., assignor to Quindar Electronics, Inc., Springfield, N.J.

Filed Nov. 26, 1968, Ser. No. 778,957
Int. Cl. H04m *11/06*
U.S. Cl. 179—2 DP **11 Claims**

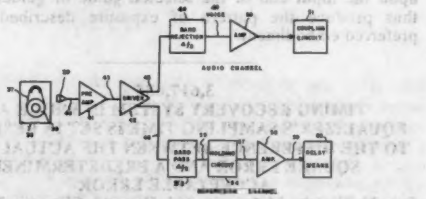


The present invention relates to a system for the central monitoring of telemetry and control systems, and, more particularly, to the central monitoring of master and remote stations of telemetry systems. The invention contemplates means for enabling the information transmitted and received by master and remote stations of a telemetry system to be transmitted to and received by a central monitoring station whereby the information is recorded by a recording means and analyzed to check the operation of the telemetry system without necessitating direct checking of the individual components of the system, i.e., the master and remote stations thereof, which are geographically located at installations remote from that of the central monitoring station. One means contemplated for the transmission of information or, more properly, data to the central monitoring station is by telephone lines in conjunction with acoustical coupling devices connected among the telephone lines, the operating stations of the telemetry system and the central monitoring station. The central monitoring station also is adapted to communicate vocally with the operating stations in order to facilitate any necessary repair.

3,617,640
AUTOMATIC SIGNALING AND REPORTING SYSTEM

Henry J. Cichanowicz, 1165 Westmoor Drive, Galion, Ohio

Filed Jan. 5, 1968, Ser. No. 696,054
Int. Cl. H04m *11/04*
U.S. Cl. 179—5 P **6 Claims**



A system, capable of utilizing a conventional telephone network, for automatically dialing and reporting a monitored event, is disclosed which comprises means for recording a first frequency capable of acting both as a supervision tone, for maintaining the circuit connection to the telephone line, and as the dial-pulsing tone, for automatically dialing a receptor position, such as a fire station or police station. A recorded message in the audio frequency range is superimposed upon the first frequency. The superimposed first and second frequencies are prerecorded on a recording means, such as a track of a recording tape. A plurality of similar superpositions may be recorded on a multiple-track-recording tape network. In response to the actuation of a sensor monitoring a predetermined event, such as a fire or an intrusion, input circuit means are actuated to receive the output of the recording means which is representative of the monitored event, to the exclusion of would-be interrupting events on other channels. The input circuit means are coupled through amplifier circuit means to filter means. Filter means separate the supervision and dialing frequency from the audio frequency. Detector circuit means are connected to the filter circuit means for receiving the filtered supervision dialing tone. The programming of the network is such that a short period of time elapses between the actuation of the detector means and the acquisition of the dial tone before dialing is initiated. The electronic dialing is accomplished by successive actuation and deactuation of dialing pulses, particularly timed in accordance with telephone requirements. After the dialing has been completed, particular circuit features of the detector network are so arranged that the supervision tone maintains the circuit in an online condition, particularly where minute breakages and interruptions occur in the recording. After a short period of time has elapsed, a prerecorded audio message is transmitted through the telephone network. Power circuit means, channel-switching networks, shutoff networks, condition indicators, and the like, are further disclosed. In addition, an identifying signal network feature for use by the receiving party to attest to the integrity of the sending unit is disclosed to avoid false alarm actuation. In addition, an open microphone feature is disclosed whereby upon completion of the dialing cycle and transmission of the recorded message, the line will remain open to provide the receiver with the opportunity to monitor audibly the sending area.

3,617,641

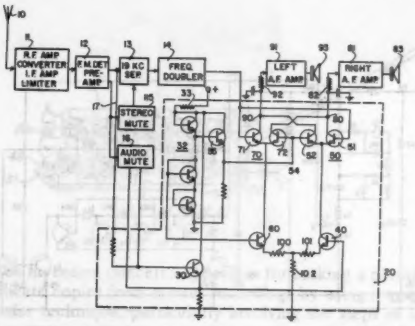
STEREO MULTIPLEX DEMODULATOR

James H. Fiet, Chicago, and Francis H. Hilbert, River Grove, both of Ill., assignors to Motorola, Inc., Franklin Park, Ill.

Continuation of application Ser. No. 797,528, Feb. 7, 1969, now abandoned. This application Apr. 29, 1970, Ser. No. 31,822

Int. Cl. H04h 5/00

U.S. Cl. 179—15 BT 16 Claims



A silicon, monolithic, integrated circuit, stereo multiplex demodulator includes a first-gated symmetrical demodulator for providing the desired left and right output signals. A second-gated synchronous demodulator similar to the first is supplied with the same composite input signals supplied to the first demodulator; but the signals supplied to the second demodulator are substantially attenuated, with the second demodulator are substantially attenuated, with the second demodulator providing output signals in phase opposition to the output signals supplied by the first demodulator. The outputs of the two demodulators are combined so that the crosstalk components are effectively eliminated, since the attenuation of the signal supplied to the second demodulator is chosen so that the output of the second demodulator is equal in magnitude to the crosstalk component in the output of the first demodulator.

3,617,642

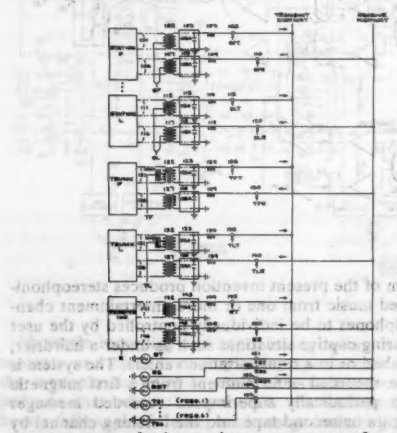
TIME DIVISION MULTIPLEX SYSTEM

Enn Aro, Galion, Ohio, assignor to North Electric Company, Galion, Ohio

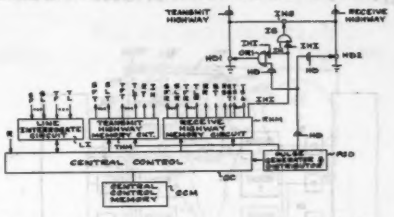
Continuation of application Ser. No. 692,430, Dec. 21, 1967, now abandoned. This application June 10, 1970, Ser. No. 48,824

Int. Cl. H04j 3/00

U.S. Cl. 179—15 AA 11 Claims



Arrangements for improving resonant transfer operation in time division multiplex communication systems by providing proper terminating impedance for lines connected to the highways during signal splitting by actuating the highway discharge gate during the signal transfer interval of the assigned time slot. In one embodiment involving interhighway gate means connected between transmit and receive highways, the inhibit signal to the interhighway gate means



which accomplishes splitting is also directed as an enable signal to the highway discharge gate. At times, such as during the ringing operation, only the transmit highway discharge gate is so controlled, and at other times, such as during trunk signaling, both transmit and receive highway discharge gates may be so controlled.

3,617,643

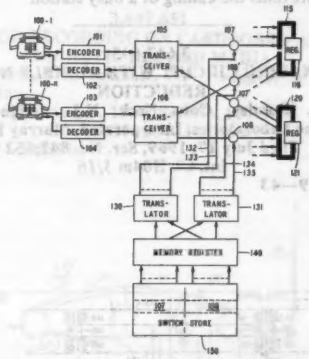
TIME DIVISION SWITCHING SYSTEM EMPLOYING COMMON TRANSMISSION HIGHWAYS

Walter R. Nordquist, Naperville, and Wing N. Toy, Glen Ellyn, both of Ill., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 25, 1969, Ser. No. 844,945

Int. Cl. H04j 3/00

U.S. Cl. 179—15 AQ 8 Claims



In a time division switching system, speech samples from a subscriber station are first encoded and then stored, in digital coded form in a register in a transceiver. The output of this register is gated to a second register in the common talking bus or highway during a first portion of a time slot; the sample from this register in the common highway is gated in a later portion of the same time slot to a similar transceiver connected to the called subscriber. It is then subsequently decoded and applied to the called subscriber. Two-wire, four-wire, and conferencing arrangements are disclosed.

3,617,644

SATELLITE COMMUNICATION EXCHANGE STATION

John F. Boag, Billericay, England, assignor to The Communications Satellite Corporation

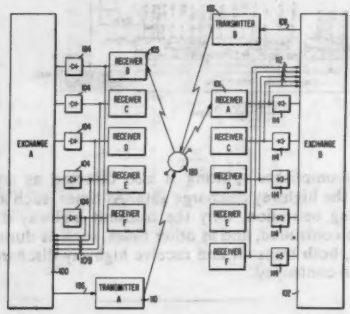
Filed July 8, 1968, Ser. No. 743,124

Int. Cl. H04q 7/04

U.S. Cl. 179—41 A 12 Claims

Communication paths between a plurality of earth stations on a demand assignment basis are provided. Each participat-

ing station transmits a carrier that is received by all other stations and identifies the transmitting station. A remote station is called by transmitting the remote station calling frequency or address via the local carrier. The remote station then detects its address frequency on the local station carrier and automatically locks onto the channel carrying signals received from the local station. The remote station then transmits the signal frequency or address of the local station via the remote



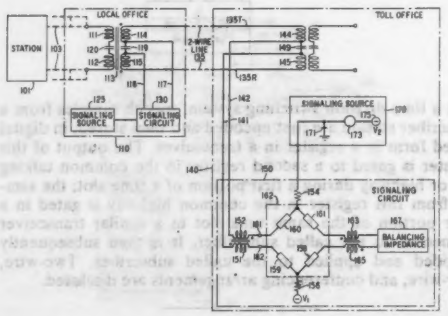
station carrier. When the address is received at the local station, it automatically locks onto the channel carrying signals received from the remote station, thereby providing a communication circuit (two-way communication path) between the calling and the called stations. Each participating station sends out a busy signal during the entire time it is in use. The busy signal from any one station is received by all other stations and prevents the calling of a busy station.

3,617,645

SIGNALING CIRCUIT WITH AUDIBLE NOISE REDUCTION

Robert H. Gumley, Colts Neck, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 17, 1969, Ser. No. 842,652
Int. Cl. H04m *5/16*
U.S. Cl. 179—43 **7 Claims**



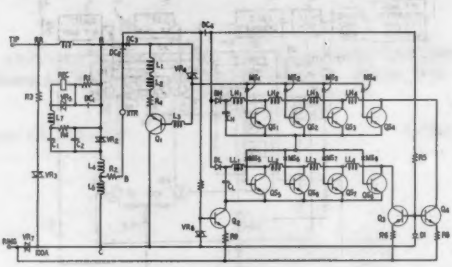
A signaling circuit connected between a signal source and a transmission path includes a pair of mutually coupled inductors connected in series with the conductors leading to the transmission path. The mutual coupling between the inductors operates to produce equal signals in the same direction on both conductors connected to the path.

3,617,646

MULTIFREQUENCY OSCILLATOR EMPLOYING SOLID-STATE DEVICE SWITCHING FOR FREQUENCY SELECTION

Dieter J. H. Knollman, Matawan, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 22, 1969, Ser. No. 843,326
Int. Cl. H04m *1/50*
U.S. Cl. 179—90 K **5 Claims**



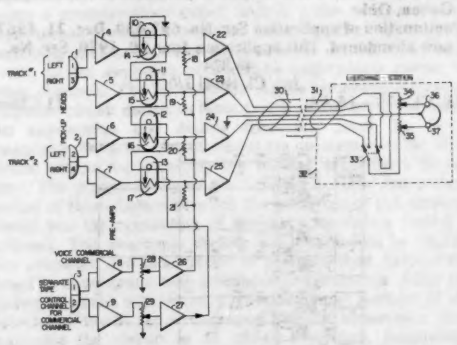
Signal frequency combinations in a multifrequency signal generator are produced selectively by establishing conductive paths through switched transistors to connect respective frequency-determining elements into the oscillator circuits.

3,617,647

PLURAL STEREO TAPE AUDIO LEVEL CONTROL SYSTEM FOR MULTIPLE UNITS

Edwin H. Maier, Catonsville, Md.; Joseph C. Stettner, Columbus, Ohio, and David C. Smith, Baltimore, Md., assignors to Styles N'Sound Inc., Catonsville, Md.

Filed Mar. 14, 1969, Ser. No. 807,255
Int. Cl. G11b *15/06*
U.S. Cl. 179—100.1 C **7 Claims**



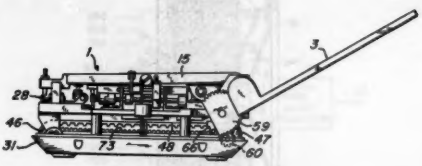
The system of the present invention produces stereophonically recorded music from one or more entertainment channels to headphones to be individually controlled by the user and worn during captive situations such as under a hairdrier, in a hospital bed or in a transportation vehicle. The system is to reproduce recorded entertainment from a first magnetic tape and to periodically superimpose recorded messages from a separate or second tape into the listening channel by reducing the audio signal on the entertainment channel to give precedence to the recorded message.

3,617,648

MAGNETIC COPYING APPARATUS WITH INERTIA CONTROL FEATURE

William F. Irving, and Walter F. Klein, both of Lexington, Ky., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 13, 1969, Ser. No. 876,508
Int. Cl. G11b 5/86
U.S. Cl. 179—100.2 E 7 Claims



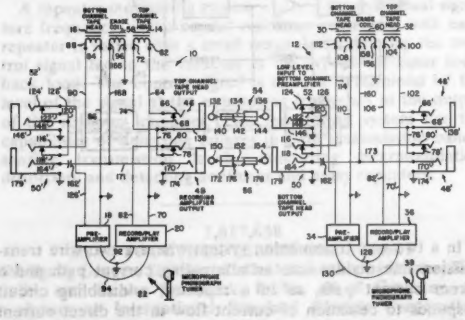
The invention concerns apparatus for making a plurality of duplicate copies from master recordings by using a magnetic transfer technique, particularly involving the steps of applying pressure between a master media and a blank copy media, thereafter moving an assembly of permanent magnets across the superimposed media to effect transfer of the information from the master media to the copy media by utilizing a one-way clutch mechanism interposed between the driving mechanisms and the permanent magnet assembly, all of the foregoing being accomplished by movement of a single operating member accessible to the operator and subsequently, due primarily to the clutch relationship with the permanent magnet assembly, releasing the magnet assembly at the end of its travel, thereby reducing inertia effects that would otherwise be objectionable from a loading standpoint.

3,617,649

MEANS FOR INTERCONNECTING TWO MONOPHONIC RECORDERS FOR STEREO RECORDING, REPRODUCING AND DUPLICATING

John Hartley, 2904 N. Paula, Clovis, Calif.

Continuation-in-part of application Ser. No. 615,010, Feb. 9, 1967, now abandoned. This application Feb. 16, 1970, Ser. No. 11,515
Int. Cl. G11b 5/00, 5/86
U.S. Cl. 179—100.2 2 Claims



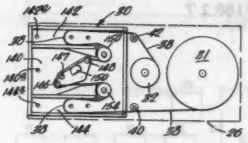
Magnetic recording and reproducing system utilizing two separate and distinct monophonic tape recorders. Each of the monophonic units is provided with a stereo head and jacks so that when the two units are interconnected they have a full range of stereophonic usage including playing and recording of stereophonic tape. The units retain their monophonic capability when disconnected from each other.

3,617,650

AUTOMATIC THREADING MECHANISM USING THREE TAPE LOOPS

Herbert Morello, Phoenixville, Pa., assignor to Digital Information Devices, Inc., Norristown, Pa.

Filed Dec. 4, 1968, Ser. No. 781,163
Int. Cl. G11b 15/66
U.S. Cl. 179—100.2PM 15 Claims



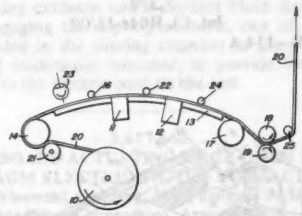
Referred apparatus employs a cartridge in the form of a narrow casing containing a supply of magnetic tape on and between a supply reel and takeup reel. The cartridge is inserted from above into a well in a support housing which is hinged along a bottom edge to move out from the console for loading and unloading and back to the console for cooperation with a tape drive. The tape reel supporting structure engage and center on drive hubs, and a vacuum system, including ports through the hubs, holds the reel supporting structure to the drive hubs. Automatic threading is then accomplished. Tape is withdrawn by vacuum through an opening in an edge of the cartridge through a vestibule into the middle one of three loop boxes opening into the vestibule. When in the middle loop box a pickup and recording head is moved across the box within the loop. Thereupon the vacuum is released in the middle box and imposed on each of two outer loop boxes opening into the vestibule each side of the middle box. This latter action pulls the tape around driving capstans in position to operate.

3,617,651

DEVICE FOR RECORDING ON CARDBOARD AND LIKE MAGNETIC RECORD MEDIA

Robert C. Bell, East Setauket, N.Y., assignor to Beltronix Systems, Inc.

Filed Aug. 5, 1969, Ser. No. 849,283
Int. Cl. G11b 5/78, 15/60
U.S. Cl. 179—100.2 R 3 Claims



Device for recording on a continuous, relatively stiff magnetizable record medium including a source of supply for said record medium, at least one magnetic transducer head, a bedplate having a radius of curvature essentially the same as the radius of curvature of the transducer heads and apertures accommodating each of the heads, means for reversely flexing the record medium before it enters its line of travel over the bedplate and means drawing the record medium from the supply source, over the flexing means, and across the bedplate and thus into close contact with the transducer heads. Optional features include supplementary auxiliary holddown means for the record medium in positions proximate to the transducer heads, photocell or like control means to actuate the transducer heads in sequence with predetermined portions of the record medium, and tension control means for regulating the tension of the record medium as it is fed to further processing stations.

3,617,652
ARRANGEMENT FOR CONTROLLING THE RECORDING OF SIGNALS ON MAGNETIC STORAGE DEVICES

Gerhard Krause, Darmstadt, Germany, assignor to Fernsch GmbH, Darmstadt, Germany

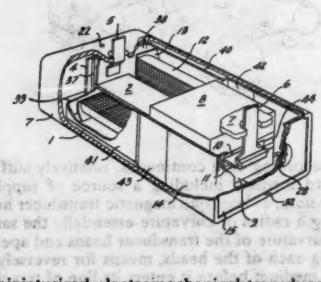
Filed June 6, 1969, Ser. No. 831,109
Claims priority, application Germany, June 8, 1968, P 17 74 392.9
Int. Cl. G11b *27/36, 5/34, 5/38*
U.S. Cl. 179—100.2 T 14 Claims

An arrangement for controlling the recording of signals on magnetic storage devices while the recording process takes place. Magnetic tape has information recorded on it through tracks which are inclined to the direction of motion of the tape. Viewed from the direction of motion of the magnetic tape, a control magnetic head is located behind the recording head. An electromagnetic coil wound upon the control magnetic head directs magnetic flux lines perpendicular to the direction of the recorded tracks. A voltage signal dependent upon the central magnetization of the tracks is generated and indicated. The electromagnetic coil may be in the form of an oscillating circuit with resonance frequency as a function of the magnetization of the tracks. A signal varying with the resonance frequency is indicated.

3,617,653
MAGNETIC REED TYPE ACOUSTIC TRANSDUCER WITH IMPROVED ARMATURE

George C. Tibbetts, and Joseph A. Sawyer, both of Camden, Maine, assignors to Tibbetts Industries, Inc., Camden, N.J.

Continuation of application Ser. No. 638,878, May 16, 1967, now abandoned. This application Feb. 2, 1970, Ser. No. 7,370
Int. Cl. H04r *11/00*
U.S. Cl. 179—114 A 18 Claims

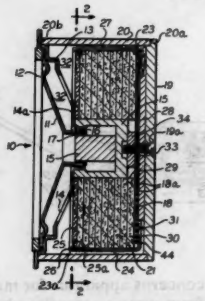


A miniaturized electromechanical transducer has a casing of high magnetic permeability material, magnets within the casing providing polarizing flux across a working gap, an electrical signal coil, and an armature of particular configuration. The armature has a substantially straight leg portion compliant in flexure and extending from the working gap through the coil to a crosspiece portion connected to another portion of the armature attached to the casing, whereby the position of the armature leg in the working gap may be adjusted by twisting inelastically the crosspiece portion.

3,617,654
ELECTROACOUSTIC TRANSDUCER

Stephen L. Heidrich, 24 Richmond Drive, Darien, Conn.

Filed Nov. 18, 1968, Ser. No. 776,718
Int. Cl. H04r *1/28*
U.S. Cl. 179—115.5 R 15 Claims

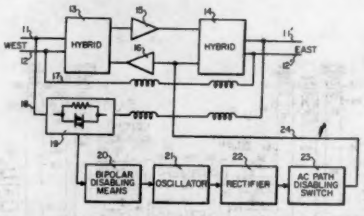


An electroacoustic transducer comprising a fluidtight housing at the rear of an acoustic diaphragm. A cartridge, including at least one wall enclosing a rear chamber and compressing a density optimizing damping means therein, is inserted in the housing dividing the latter into a front chamber adjacent the diaphragm and an air duct communicating the front chamber with the rear chamber, providing an optimized acoustic resistance-compliance network providing optimum acoustic response comparable to the electrical input.

3,617,655
DISABLING CIRCUIT OF A TRANSMISSION LINE AMPLIFIER

Russell C. Fischer, Wheaton, Ill., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed June 1, 1970, Ser. No. 42,370
Int. Cl. H04b *3/44*
U.S. Cl. 179—170.4 2 Claims

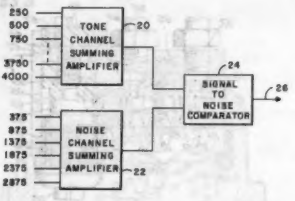


In a two-way transmission system where a two-wire transmission line divides into an alternating current path and a direct current path, as in a repeater, a disabling circuit responds to cessation of current flow in the direct current path to disable the alternating current path. The disabling is required to prevent self-oscillation resulting from mismatch of impedance in hybrid circuits when the line is not in use. The input circuit of the disabling circuit includes a varistor connected in parallel with the series resistor to limit voltage drop used for sensing. The control switch that is connected to this sensing circuit comprises a pair of complementary transistors, a different one being conductive for each direction of current flow in the direct current path.

3,617,656
TEST SPECTRUM RECOGNITION CIRCUIT FOR COMMUNICATION LINK ANALYZER

William S. Elliott, Cedar Rapids, Iowa; Ronald F. Palmer, Ralston, Nebr., and Robert H. Pool, Marion, Iowa, assignors to Collins Radio Company, Dallas, Tex.

Filed Sept. 25, 1969, Ser. No. 861,107
Int. Cl. H04m 1/24, 3/22
U.S. Cl. 179—175.3 8 Claims

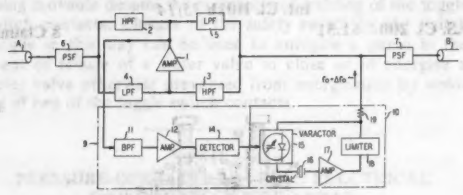


In a communication link analyzer including a test signal generator for generating a frequency spectrum and a signal analysis unit for receiving said spectrum through a communication link, a signal recognition circuit is provided to recognize the presence of said spectrum. Tone channels and noise sampling channels are monitored, summed and compared by the signal recognition circuit.

3,617,657
REPEATER MONITORING SYSTEM

Sherman T. Brewer, Little Silver, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 25, 1969, Ser. No. 852,813
Int. Cl. H04b 3/46
U.S. Cl. 179—175.31R 5 Claims



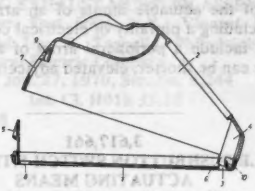
A repeater monitoring system wherein the individual signature frequency of the crystal oscillator associated with each repeater is varied over a small range determined by the control signal fed to the varactor in the crystal oscillator feedback loop. The control signal is in turn determined by the level of the signal at the monitoring frequency at the output of the repeater amplifier. This monitoring system has the capabilities of detecting failures in both transmission bands, sensing transmission levels, measuring intermodulation distortion, and detecting nonlinear and noisy repeaters.

3,617,658
SNAP-TOGETHER TELEPHONE SUBSET

Wolfgang Gruger, Stuttgart-Zuffenhausen; Heinz Ruster, Berlin, and Gunter Schwanck, Berlin, all of Germany, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Sept. 12, 1969, Ser. No. 9,461
Claims priority, application Germany, May 29, 1969, P 19 27 443.2
Int. Cl. H04m 1/02
U.S. Cl. 179—179 4 Claims

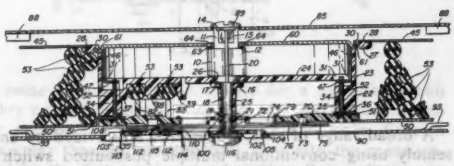
The baseplate and the cover of the subset are connected in such a way to one another that projections are arranged on the front side of the cover, for engaging correspondingly shaped slots provided in the baseplate, and in that on the rear side of the cover there is provided a recess which is engaged by a flexible hook-shaped projection provided on the baseplate.



3,617,659
ELECTRIC CORD REEL

Jerry H. Freeman, Mt. Prospect, Ill., assignor to Power Pak, Inc., Chicago, Ill.

Continuation-in-part of application Ser. No. 677,976, Oct. 25, 1967, now abandoned. This application May 25, 1970, Ser. No. 22,539
Int. Cl. H02g 11/00
U.S. Cl. 191—12.2 31 Claims

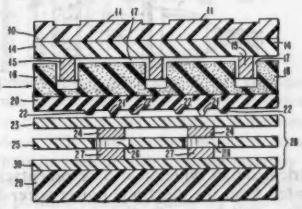


A cord reel structure for an electric cord includes a stationary arbor and a reel for an electric cord rotatably mounted thereon. The reel includes a molded synthetic plastic hollow hub having a cylindrical wall, a circular partition wall forming a spring motor chamber for a spiral spring and a slipring chamber for a slipring electrical connector in the hub, and a central bearing in the partition wall for rotatably mounting the hub on the arbor. An annular flange extends radially from each end of the hub to form the reel. The slipring electrical connector includes a slipring block having slipring contacts and a contact block having spring contacts engaging the slipring contacts, one of the blocks being mounted in the slipring chamber in the hub and the other being stationarily mounted, to provide for electrical connection to the electric cord on the reel.

3,617,660
KEYBOARD ACTUATING MECHANISM FOR DIAPHRAGM ELECTRIC SWITCH CONTACT ARRAY

Morris Krakinowski, Ossining, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 23, 1970, Ser. No. 5,431
Int. Cl. H01h 9/00, 43/08, 3/12
U.S. Cl. 200—1 R 21 Claims



A manual keyboard includes a nomenclature bearing sheet supported on a rigid frame having finger keying openings

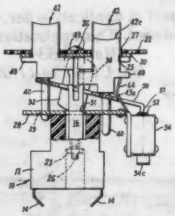
through which soft elastomeric pads project. Below the pads an actuator sheet bearing clusters of individual projections is positioned with the projections aligned with the openings for operation of the actuable inputs of an array of diaphragm switches including a plurality of electrical contacts. Stops for projections include a peripheral array of additional projections which can be shorter, elevated adjacent surface areas or rings.

3,617,661

MULTIPLE PUSHBUTTON SWITCH WITH IMPROVED ACTUATING MEANS

Harald Nome, Bloomfield, and Herman E. Zickfeld, Watertown, both of Conn., assignors to M. Z. M. Corp., Plainville, Conn.

Filed June 26, 1970, Ser. No. 50,117
Int. Cl. H01h *9/26, 3/00*
U.S. Cl. 200—5 R **19 Claims**



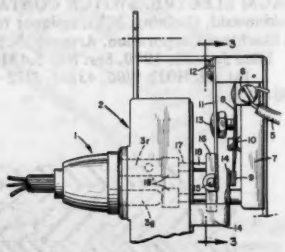
A broad range of switch operation is provided by an assembly using conventional multiple pushbutton switch for selective electrical connection of a plurality of terminals, a second switch, and a housing providing a pivot assembly and two rows of operating pushbuttons. The operating pushbuttons control the conventional switch directly and the second switch indirectly by means of the pivot assembly which discriminates between the rows of buttons depressed so that the second switch serves to double the range of the basic conventional pushbutton switch.

3,617,662

SAFETY ELECTRICAL OUTLET

Charles Frank Miller, Mathews Co., Va., assignor to Tidewater Research Corporation

Filed Feb. 3, 1970, Ser. No. 8,294
Int. Cl. H01r *33/30*
U.S. Cl. 200—51.09 **5 Claims**



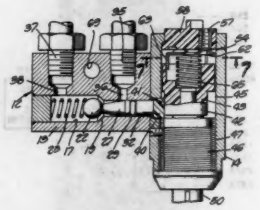
An electrical outlet wherein a plug receptacle is electrically separated from the electrical power wirer by the interposition of a switch means therebetween, which switch means is actuable only by the simultaneous insertion of at least two plug prongs into the receptacle.

3,617,663

ANTITHEFT LOCK FOR VEHICLE BRAKES AND IGNITION SYSTEM

Lawrence C. Whittemore, 19641 Waterbury Lane, Huntington Beach, Calif.

Filed Aug. 19, 1970, Ser. No. 64,992
Int. Cl. B60r *25/08;* **H01h** *27/06, 21/28*
U.S. Cl. 200—61.86 **5 Claims**



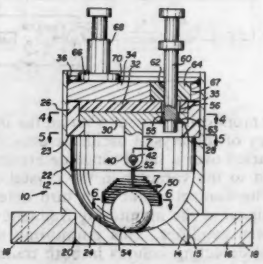
A lock mechanism for vehicles having two pairs of hydraulic brakes, each pair separately actuated from a dual master cylinder assembly, includes a pair of check valves which act to retain fluid under pressure in the individual brake cylinders to prevent movement of the vehicle. The check valves are both opened by a key-operated cam acting through a crosshead to release the brakes when desired. The cam operates a rotary electrical switch to interrupt the starter switch circuit when the check valves are closed.

3,617,664

ACCELERATION-RESPONSIVE SWITCH

Leonard P. Tetrault, Northport, N.Y., assignor to Aerodyne Controls Corporation, Farmingdale, N.Y.

Filed Mar. 31, 1970, Ser. No. 24,121
Int. Cl. H01h *35/14*
U.S. Cl. 200—61.51 **8 Claims**



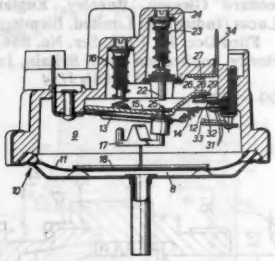
A switch assembly responsive to disturbance and displacement includes a baseplate on which is mounted a cylindrical electrically conductive shell. The shell has a cylindrical cavity with a spherically curved bottom surface on which is a freely moveable electrically conductive ball. The ball is surrounded by a tapered pendulum supported by an electri: ally conductive disk insulated from the shell. The pendulum is spaced from the ball radially and circumferentially. Electrical terminals are connected in circuit with the pendulum and shell respectively. Any displacement, disturbance, tilt, acceleration or vibration of the assembly beyond a predetermined magnitude causes the ball and pendulum to contact each other and close an external alarm or indicating circuit which may be connected to the electrical terminals.

3,617,665

SNAP-ACTION PRESSURE-SENSITIVE SWITCH WITH SAFETY FEATURE RESPONSIVE TO CONTACT WELDING

Johannes J. Berson, Mook, and Joseph Pilet, Nijmegen, both of Netherlands, assignors to Controls Company of America, Melrose Park, Ill.

Filed Dec. 4, 1969, Ser. No. 882,140
Claims priority, application Great Britain, Dec. 13, 1968, 59,540/68
Int. Cl. H01h *35/34*
U.S. Cl. 200—83 R 7 Claims



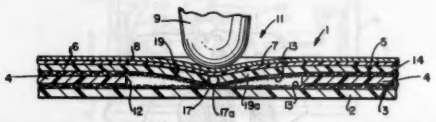
The pressure switch comprises a toggle switch in which a flexible switch tongue is moved by a pressure-actuated diaphragm against the force of a return spring, and a contact-carrying flexible switch blade, connected to the blade tongue, through an overcenter spring, is moved by snap-action in one direction as the blade tongue moves through the overcenter position in the opposite direction: To effect a safety function; a contact is movable by the switch tongue to engage a stationary contact after a predetermined movement of the switch tongue past the overcenter position, the switch tongue being movable despite the possibility of welding of the toggle switch contacts. Closure of the safety switch by the switch tongue in this way can be used to energize a pump in the event of failure of a water valve to close or to energize a water valve otherwise prevented from energization by welding of two of the toggle switch contacts.

3,617,666

PRESSURE-OPERATED LAYERED ELECTRICAL SWITCH AND SWITCH ARRAY

Charles E. Braue, Crestwood, N.Y., assignor to Data Appliance Corporation

Filed Apr. 30, 1970, Ser. No. 33,367
Int. Cl. H01h *43/08*
U.S. Cl. 200—86 12 Claims



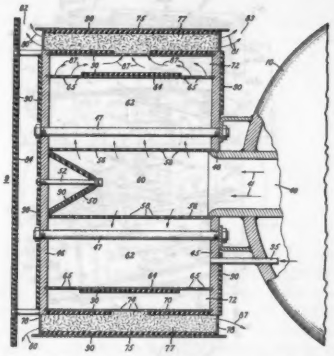
A pressure-operated electrical switch unit having a layered construction including a substantially planar surface to which pressure is applied to close the switch. The removal of the pressure opens the switch. The switch includes a layer having at least one elongated opening in it which permits portions of the layer to be deflected into an opening in an adjacent layer to move one electrically conductive layer to complete the electrical circuit. An array of the switches may be used for supplying signals created by the pressure of a writing instrument.

3,617,667

GAS-BLAST CIRCUIT BREAKER WITH NOISE-REDUCING EXHAUST MUFFLER ASSEMBLY

Francis Kirschner, East Hills, N.Y.; Vincent N. Stewart, Springfield, and Ugo R. Tognella, Philadelphia, Pa., assignors to General Electric Company

Filed Jan. 27, 1970, Ser. No. 6,244
Int. Cl. H01h *33/58*
U.S. Cl. 200—148 11 Claims



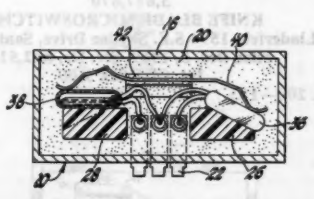
A noise-reducing exhaust muffler for a gas-blast circuit breaker comprises spaced end walls and four concentric tubular members mounted between the end walls. Exhaust gases enter through one end wall, flow into the space enclosed by the first tubular member, then flow radially outward through holes in the first, second, and third tubular members, and then axially of the muffler between the third and fourth tubular members. The holes in the third and second tubular members are in axially staggered locations so as to introduce additional turns into the flow path and provide solid wall barriers to the radiation of sound energy.

3,617,668

SWITCH OPERATING MECHANISM

Thomas E. Lohr, Warren, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 9, 1969, Ser. No. 865,035
Int. Cl. H01h *29/00*
U.S. Cl. 200—152 2 Claims

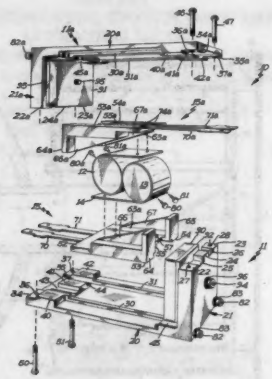


The invention relates generally to a switch-operating mechanism and, more particularly, to a switch-operating mechanism for controlling the up-down movement of automobile windows. The mechanism includes separate up-down pushbuttons in contact with separate mercury switches, with each of the pushbuttons having a cam arrangement that includes on-off position ramps to guide the mercury switches. Each pushbutton is spring biased to the off position to automatically return the mercury switch it contacts to the off position upon pushbutton release.

3,617,669
ROLAMITE APPARATUS

Patrick M. Maloney, St. Paul, and Gary R. Bluem, Golden Valley, both of Minn., assignors to Kroy Industries Inc., Stillwater, Minn.

Filed May 19, 1969, Ser. No. 825,728
Int. Cl. H01h 3/32
U.S. Cl. 200—153 R 18 Claims

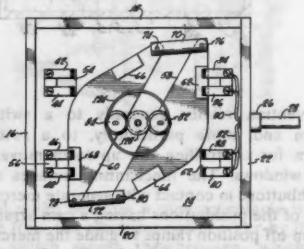


Rolamite apparatus including a pair of rollers entrapped in the loops of a generally S-shaped band with each of the rollers being electrically conductive and having electrical contacts extending radially outward therefrom and through the band and having an enlarged head portion which secures the band to the rollers. A housing for the rolamite apparatus has a pair of slide members longitudinally movable therein, one of them cooperating with each of the rollers and providing a guide and an end stop for the cooperating roller and having one end of the flexible band fixed to it whereby the slide members can be moved longitudinally relative to each other to affect tensioning of the band. The slide members also have fixed thereto contacts cooperable with the electrical contacts which are carried by the rollers in predetermined positions of the rolamite device. In the disclosed arrangement the band applies no substantial bias to the rolamite device and calibration is accomplished by longitudinally movable permanent magnets disposed on each end of the frame and establishing a magnetic coupling with the rollers which are formed of magnetically attractable material. In an alternative form the band provides an internal bias urging the rollers to one position while a permanent magnet establishes a magnetic coupling with the rollers and is adjustable longitudinally to provide adjustment of this coupling force.

3,617,670
KNIFE BLADE MICROSWITCH

Hal R. Linderfelt, 1594 S.E. Skyline Drive, Santa Ana, Calif.

Filed Dec. 5, 1969, Ser. No. 882,513
Int. Cl. H01h 3/00
U.S. Cl. 200—153 39 Claims

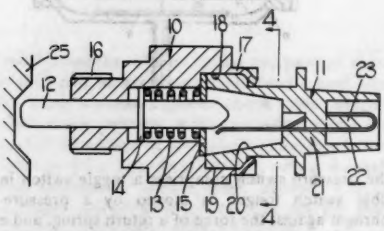


A linear-to-pivotal motion converting mechanism including a pair of blades pivotally secured at the ends in spaced relation in the form of a variable-area quadrilateral, hubs mounting the blades for pivotal movement about points displaced from the centers of the respective blades and an actuator for moving the hubs apart transversely thereby causing the blades to pivot about the hubs is disclosed. An electrical switch utilizing the mechanical movement is also disclosed. The switch is suitable for miniaturization as a microswitch and provides a knife switch wiping action with electrical contacts.

3,617,671
PLUNGER-OPERATED SWITCH WITH OFFSET ADJUSTMENT MEANS

Robert Leonard Gleeson, Burnley, England, assignor to Joseph Lucas (Industries) Limited, Birmingham, England

Filed Dec. 18, 1969, Ser. No. 886,271
Claims priority, application Great Britain, Jan. 3, 1969, 539
Int. Cl. H01b 1/34
U.S. Cl. 200—159 R 2 Claims

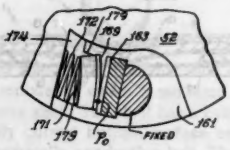


An electrical switch having a two-part body, one part carrying a spring-loaded plunger and the other part carrying an electrical contact member, and the two parts of the body having respective cylindrical surfaces which are coaxial and parallel to the axis of the plunger, but the axes of the plunger and of the said cylindrical surfaces being offset and assembly of the switch being accomplished by fitting the plunger and the contact member to the parts of the body respectively, and fitting the two parts of the body together and rotating them relatively to one another with the plunger in its inward operative position until the contact member and plunger engage the two parts of the body then being secured in such a relative position.

3,617,672
WOBBLE BUTT CONTACT SWITCH

Namik O. Atakkaan, Buffalo Grove, Ill., assignor to Appleton Electric Company, Chicago, Ill.

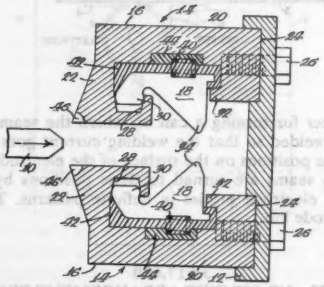
Filed Oct. 13, 1969, Ser. No. 865,595
Int. Cl. H01h 1/36
U.S. Cl. 200—164 3 Claims



One of each pair of butt contact elements has a convex contact surface. In the moment after closing, or before opening of the switch, the contact elements pivot or wobble with respect to each other while in contact with each other. Arcing does not damage a second contact point at which the elements are in operating contact while the switch is at rest in the closed position, since this point is spaced apart from a first contact point at which the contact elements first abut,

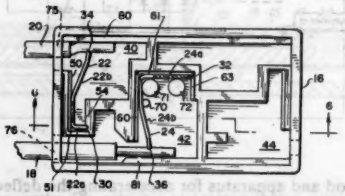
during closing, or separate, during opening of the switch. In a particularly useful embodiment, the switch includes fixed, spaced-apart line contacts, and a moveable conductive bridge carried on an insulated operator-controlled snap rotor element which includes means for assuring a first and second contact point by assuring pivoting or wobbling of the bridge in the moment after contact is made, or before contact is broken, with the fixed line contact elements.

3,617,673
CONTACT STRUCTURE
Donald E. Weston, East Sebago, Maine, assignor to H. K. Porter Company, Inc., Chicago, Ill.
Filed June 18, 1970, Ser. No. 47,429
Int. Cl. H01h *1/46*
U.S. Cl. 200—166 E 12 Claims



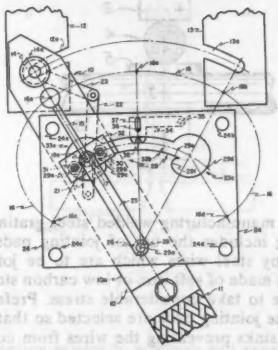
Contact structure having a pair of juxtaposed contact assemblies each having a generally L-shaped housing and terminal means at the free end of one leg of the housing. Contact members pivotally mounted on the other leg and generally paralleling the one leg to provide a reverse loop path of current flow. Means biasing the contact members away from the one leg including a yieldable moisture-impervious material filling the space between the contact members and the housing to prevent entry of moisture therebetween.

3,617,674
ELECTRICAL SWITCH HAVING INSULATED COVER FOR THE SWITCH TERMINALS
Thomas F. Osika, Gary, Ind., assignor to McGill Manufacturing Company, Inc., Valparaiso, Ind.
Filed Oct. 13, 1970, Ser. No. 80,396
Int. Cl. H01h *1/58*
U.S. Cl. 200—166 CT 5 Claims



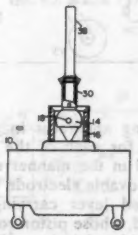
A plastic housing is fitted over the terminals of an electrical switch to electrically insulate the terminals in an operating installation. The plastic housing has integrally molded therewithin pockets for receiving the switch terminals. Each of the switch terminals has a serrated edge which, when the housing is fitted over the terminals, becomes embedded in the walls of the pocket to securely lock the housing to the switch body. Each of the terminals also has an extension which engages a wire when it is fitted into the housing, and traps the wire between it and a wall of the pocket to physically lock the wire within the housing and to electrically connect the same to the switch terminal.

3,617,675
HEAVY-DUTY SWITCH
George H. Pohm, Lorain; Harold O. Wright, Lorain, and Gary G. Siegmund, Elyria, all of Ohio, assignors to Lorain Products Corporation
Filed Feb. 27, 1970, Ser. No. 15,071
Int. Cl. H01h *1/50*
U.S. Cl. 200—170 A 2 Claims



A pressure contact switch having a control member fixed with respect to a movable contact thereby to translate the movable contact from one fixed contact to another fixed contact about a first center when the control member is shifted laterally. A second center is provided about which the control member is rotated at each end of the translating stroke thereby to tighten the movable contact against the respective fixed contact.

3,617,676
SWITCH HANDLE FOR FIELD ASSEMBLY
John J. Dennison, Southington, Conn., assignor to Arrow-Hart, Inc., Hartford, Conn.
Filed June 24, 1970, Ser. No. 49,449
Int. Cl. H01h *3/04*
U.S. Cl. 200—172 A 9 Claims



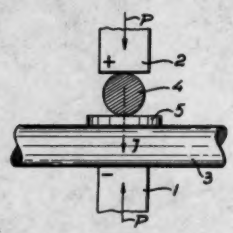
An elongated lever-type handle attachable to a switch in the field or after the switch is otherwise completely fabricated has a substantially cylindrical axial recess with an interior cylindrical bead. A switch-operating lever has a cylindrical part adapted to enter the handle recess, and a peripheral groove in which the bead seats. The outer end of the lever is tapered to facilitate sliding of the handle on the lever, and the inner end of the lever is flared and engaged by the end of the handle to afford a tight fit. Key-and-slot means on the lever and handle prevent relative rotation in engaged position.

3,617,677

METHOD OF MANUFACTURING WELDED STEEL GRATINGS

Klaus Ritter; Gerd Ritter; Josef Ritter, and Hans Gott, all of Graz, Austria, assignors to EVG Entwicklungs-u. Verwertungsgesellschaft m.b.H., Graz, Austria

Filed Sept. 5, 1969, Ser. No. 855,663
Claims priority, application Austria, Sept. 20, 1968, 9218/68
Int. Cl. B23k 11/16
U.S. Cl. 219—58 11 Claims



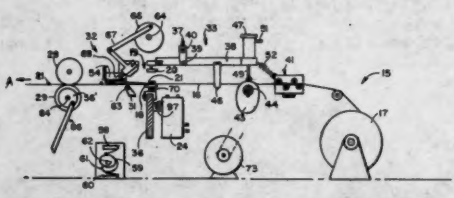
A method of manufacturing welded steel gratings by resistance welding includes the use of jointing pads inserted between the alloy steel wires which are to be joined. The jointing pads are made of soft iron or low carbon steel so that they will be able to take considerable stress. Preferably the dimensions of the jointing pads are selected so that the pads will act as heat sinks preventing the wires from cooling too rapidly. Pads which are relatively large or have a high volume of surface ratio have been found to be desirable.

3,617,678

ELECTRODE-MOVING AND PRESSURE-APPLYING MECHANISM OF WELDING APPARATUS IN AUTOMATIC MACHINERY AS FOR MAKING WIRE MESH OR THE LIKE

Sam Larkin, 254 Beach 140th St., Belle Harbor, N.Y.

Filed Aug. 11, 1969, Ser. No. 848,942
Int. Cl. B23k 11/10
U.S. Cl. 219—56 5 Claims



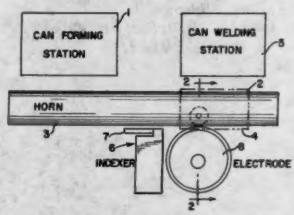
Serving in the welding apparatus in an automatic wire mesh making machine, for each of the longitudinal wires, meaning those arranged in the manner of warp, there is a fixed electrode, and a movable electrode which is at one end of a swingably mounted lever carrying an actuated air cylinder at the other end, whose piston rod is the follower of a cam; said lever being biased to keep the electrodes apart, and said cam guiding its associated longitudinal wire. Air under uniform pressure is fed to all the cylinders, or if needed, the pressure may be different in selected cylinders respectively, or two different sources offering air at different pressures are alternately fed the cylinders by automatic valve means whereby initially a relatively high pressure is applied to crush any rust on the work, and then for the greater part of the duration of the welding operation, a comparatively low, but proper operational pressure is applied. All components as necessary, are adjustable in position, so the spacing of the longitudinal wires can be changed, and there also is a means for extent of finished work movement adjustment, to change the distance between transverse wires, so the machine can be accommodated for the making of different size mesh.

3,617,679

MULTIPLE POSITION SEAM INDEXER

Anton A. Aschberger, Oak Lawn, Ill., assignor to Continental Can Company, Inc., New York, N.Y.

Filed Aug. 11, 1969, Ser. No. 848,808
Int. Cl. B23k 1/16
U.S. Cl. 219—64 7 Claims



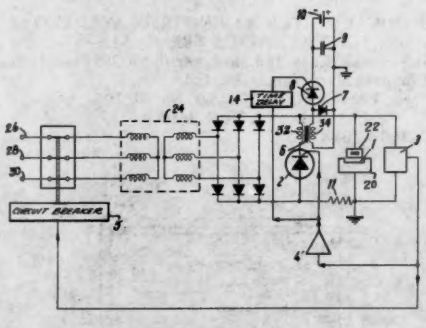
An indexer for turning a can on which the seam has not been fully welded so that the welding current goes through two or three positions on the surface of the electrode as successive can seams are turned to these positions by the indexer. The electrode erodes in definite patterns. This prolongs electrode life.

3,617,680

PROCESS AND CIRCUIT ARRANGEMENT FOR THE SWITCHING OF SHORT CIRCUITS OF INSTALLATIONS FOR THE ELECTROCHEMICAL REMOVAL OF MATERIAL

Rudolf E. Grosskopf, Aalen, Germany, assignor to AEG-Elotherm GmbH, Remscheid-Hasten, Germany

Filed Dec. 15, 1969, Ser. No. 884,805
Claims priority, application Germany, Dec. 24, 1968, P 18 16 865.5
Int. Cl. B23k 9/16
U.S. Cl. 219—69 S 11 Claims



A method and apparatus for accelerating the deflection of current from a working gap for electrochemical machining whereby, when a short circuit is detected, a current is produced in the gap opposing the short circuit current. Preferably, one or more thyristors are provided in parallel with the gap to shunt current away from the gap when a short circuit is detected and each has the secondary winding of a transformer connected to it. The primary winding of the transformer is connected to a charged capacitor which discharges through the primary winding, when a thyristor also connected in series with the capacitor is switched to a low-resistance state upon detection of the short circuit, so that a voltage is induced in the secondary winding which

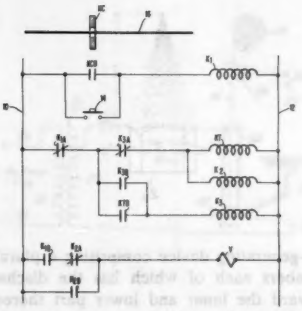
produces a current in the gap opposing the short circuit current.

3,617,681

APPARATUS FOR GAS ARC WELDING

Warren F. Dyson, Richmond, Va., assignor to C & W Control Company

Filed May 13, 1969, Ser. No. 824,195
Int. Cl. B23k 9/10
U.S. Cl. 219—74 6 Claims



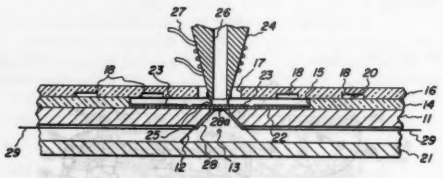
Apparatus for maintaining the flow of an inert gas around the electrode of an inert gas arc welder. The welder operator momentarily depresses a pushbutton which commences the gas flow. A sensor detects the arc welding current to maintain the gas flow so long as that current is present. After the arc is broken, the gas flow is maintained for sufficient time to cool and protect the weld and electrode, and then the gas flow is automatically terminated.

3,617,682

SEMICONDUCTOR CHIP BONDER

Robert N. Hall, Schenectady, N.Y., assignor to General Electric Company

Filed June 23, 1969, Ser. No. 835,694
Int. Cl. B23k 1/04
U.S. Cl. 219—85 10 Claims



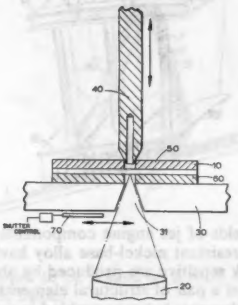
An apparatus for attaching semiconductor chips to gold pads is described as comprising a stainless steel hot stage mounted on top of a heater block having a temperature of approximately 300° C. with a platinum ribbon heater or an RF heater element protruding through a hole in the hot stage and flush with the top surface thereof so as to provide a local hot spot smaller than the gold pads to which the semiconductor chips are to be attached. A current passed through the platinum causes heating to a temperature sufficient to eutectically bond the chip to the gold pad. An inert atmosphere is provided during the bonding operation to enhance the accuracy and reproducibility of the bond.

3,617,683

METHOD AND APPARATUS FOR WORKING MATERIAL USING LASER BEAMS

Michael Patrick Beresford, Gloucester, and Brian Frederick Scott, Birmingham, both of England, assignors to The Universtiy of Birmingham, Birmingham, England and Spacratron Limited, Tuffley Crescent, Gloucester, England

Filed Jan. 13, 1970, Ser. No. 2,505
Claims priority, application Great Britain, Jan. 14, 1969, 2191/69
Int. Cl. B23k 9/00
U.S. Cl. 219—121 L 8 Claims



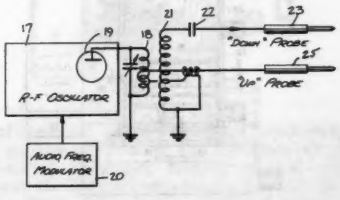
The invention relates to methods and apparatus for working materials using laser beams. The workpiece is laid on support means which include table beneath which is located a laser beam emitter and an associated optical system for focusing the laser beam. The support means, which include the worktable, has a generally vertical through hole and the workpiece is laid over this hole. The laser optical system is arranged to direct the beam from below through the hole in the support means and to focus the beam at the level of the upper end of the hole, that is, substantially on the underside of the workpiece. Means are provided above the worktable for indicating the position of the optical axis of the laser beam. Means are provided for shrouding the laser beam to prevent stray emission.

3,617,684

ELECTRONIC TRIMMING OF MICROELECTRONIC RESISTORS

Alfonso Di Mino, Woodcliff Lake, N.J., assignor to Datapax Computer Systems Corporation, New York, N.Y.

Filed Feb. 24, 1970, Ser. No. 013,697
Int. Cl. B23k 15/00
U.S. Cl. 219—121 R 4 Claims



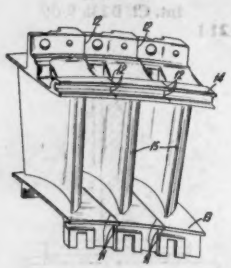
An electronic technique for changing the ohmic values of microelectronic resistors formed on a substrate, so as to either increase or decrease the values thereof without affecting their physical qualities. To bring about a decrease in value, the surface of the resistor is subjected to a corona discharge produced by radiofrequency energy having a low-frequency amplitude modulation component. The same energy source is used to effect an increase in ohmic value, this being effected by passing a heating current through the body of the resistor.

3,617,685

METHOD OF PRODUCING CRACK-FREE ELECTRON BEAM WELDS OF JET ENGINE COMPONENTS

Harry W. Brill-Edwards, New York, and Fereidoon Zahabi, Nyack, both of N.Y., assignors to Chromalloy American Corporation, Orangeburg, N.Y.

Filed Aug. 19, 1970, Ser. No. 65,063
Int. Cl. B23k *15/00*
U.S. Cl. 219—121 EB 8 Claims



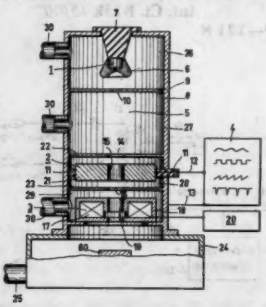
Crack-free welds of jet engine components formed essentially of a heat resistant nickel-base alloy having a tendency to be weld-crack sensitive are produced by abutting selected surface of at least a pair of structural elements of said nickel-base alloy, the elements being assembled in welding relationship with an iron-base shim therebetween, the elements being electron beam welded together into a unitary structure by melting the iron-base shim at the interface of the abutting surfaces, whereby the resulting weld which is an alloy of the iron-base shim and the nickel-base alloy is crack-free.

3,617,686

APPARATUS FOR TREATING WORKPIECES WITH MAGNETICALLY FOCUSED BEAMS OF ELECTRICALLY CHARGED PARTICLES

Walter Dietrich, 645 Hanau Reichenberger Str., Hanau; Dieter Fritz, 6461 Mittelgrundau Wiesenweg 6, Mittelgrundau, and Hans D. Kluger, 6451 Bruchkobel, am Heinischen Berg, Bruchkobel, all of Germany

Filed July 16, 1969, Ser. No. 842,244
Claims priority, application Germany, July 26, 1968, P 17 65 852.5
Int. Cl. B23k *15/00*
U.S. Cl. 219—121 EB 7 Claims



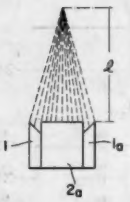
In an apparatus for the application of beams of charged particles to the treating of work and which includes an electron-optical lens for varying the energy density in the beam and an electromagnetic lens having an alternating potential component of fixed frequency superposed on its supply voltage so that the focal length of the lens varies as a function of the frequency, of means, particularly desirable for welding by electron beams, to make distribution of energy variable over the impingement section of the electron beam, that is, at the area of the treatment, whereby it becomes possible better to adapt to the properties of the material for achieving satisfactory welded connections.

3,617,687

DIRECTIONAL ARC-GENERATING DEVICE

Shuzo Katawoka, 86, 3-Chome, Kashiwasato-cho, Nishiyodogawa-ku, Osaka-shi, Osaka-fu, Japan

Filed Aug. 4, 1969, Ser. No. 847,139
Int. Cl. B23k *9/00*
U.S. Cl. 219—122 5 Claims



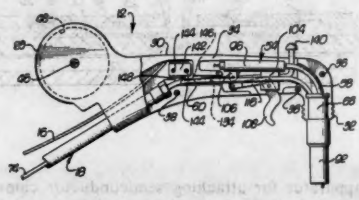
An arc-generating device comprising a plurality of electrode members each of which has the discharge surface sloped toward the inner and lower part thereof from the upper peripheral edge, said electrode members being assembled as an electrode assembly so that a conically concaved discharge space is formed by the discharge surfaces of all electrode members, and a longitudinal narrow gap is established between adjacent electrode members of each pair, whereby an electric arc is made to generate along said discharge space successively per two opposite discharge surfaces, thus establishing a directional arc stream along a common axis of the discharge surfaces, and respective pairs of the electrode members of said arc-generating device being supplied successively with pulse-shaped DC or AC voltage or a polyphase voltage.

3,617,688

TACK WELDING TORCH

Allen A. Fogelstrom, Sun Valley, Calif., assignor to SSP Industries, Burbank, Calif.

Filed July 29, 1969, Ser. No. 845,706
Int. Cl. B23k *9/00*
U.S. Cl. 219—130 2 Claims



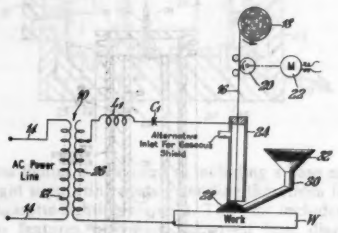
A tack welding torch adapted to be used in inert-gas-shielded-arc welding. The torch includes a handle means including a self-contained welding wire supply and means for urging said wire through said handle into contact with metal to be welded. Said torch also includes current control means for energizing said welding wire and insulating shield means disposed around the area to be welded. Mounted within the insulating shield means is an adjustable electrode in proximity to said welding wire.

3,617,689

CONSTANT POTENTIAL AC CONSUMABLE ELECTRODE WELDING

August Frederick Manz, Union, N.J., assignor to Union Carbide Corporation, New York, N.Y.

Filed Jan. 9, 1970, Ser. No. 1,693
Int. Cl. B23k 9/10
U.S. Cl. 219—131 R 6 Claims



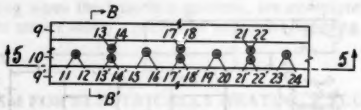
A method of establishing a self-supporting AC arc between a consumable electrode and a workpiece from a constant potential source of power comprising interposing an equivalent circuit consisting of a series-connected inductor and capacitor in series circuit relationship with the constant potential source and critically tuning the inductance and capacitance into an essentially resonant state.

3,617,690

AUTOMATIC NARROW-GAP JOINT WELDING METHOD WITH MULTIPLE ELECTRODES

Kiyoshi Terai, Ashiya; Sotaro Yamada, Tarumiku Kobe, and Nagano Tsuneo, Takarazuka, all of Japan, assignors to Kawasaki Jukogoyo Kabushiki Kaisha, Kobe, Japan

Filed Mar. 12, 1970, Ser. No. 18,900
Int. Cl. B13k 9/00
U.S. Cl. 219—137 8 Claims



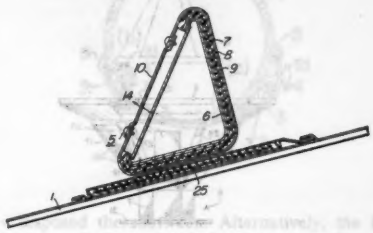
A method of welding a pair of horizontally disposed plates with a narrow groove between adjacent edges by means of electrodes projecting upwardly into the groove and in which a pair of electrodes form beads at the top edge of each surface of the groove and a single electrode connects the beads formed by the double electrodes and repeating the process to completely fill the groove.

3,617,691

HEATED SNOW STOPPER

Tadao Toyooka, Toyonaka-shi; Hiromutsu Ueda, Ibaragi-shi, and Akira Kobayashi, Toyonaka-shi, all of Japan, assignors to Matsushita Electric Industrial Co. Ltd., Kadoma-shi, Osaka, Japan

Division of Ser. No. 737,449, June 17, 1968, Pat. No. 3,521,029.
Filed Nov. 21, 1969, Ser. No. 878,598
Claims priorities, application Japan, June 19, 1967, Dec. 21, 1967; 42/53373, 42/108284
Int. Cl. H05b 1/00
U.S. Cl. 219—201 5 Claims



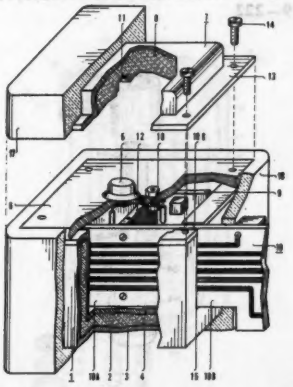
A snow stopper to be placed on a roof, which is provided with an electric heater.

3,617,692

THERMALLY CONTROLLED APPARATUS CELL

Peter Landis, Urdorf, Switzerland, assignor to Albiswerk Zurich A.G., Zurich, Switzerland

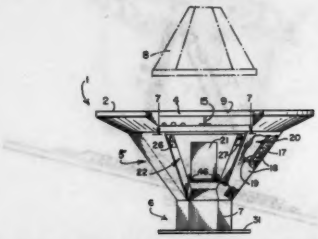
Filed Oct. 31, 1969, Ser. No. 872,948
Claims priority, application Switzerland, Nov. 21, 1968, 17336/68
Int. Cl. H05b 1/00
U.S. Cl. 219—210 6 Claims



A novel apparatus cell in which the internal temperature thereof is maintained constant. The apparatus cell embodies a double-walled pot-shaped housing of heat conducting material with the hollow compartment between the double walls being filled with a heat-insulating material. A plate member also formed of a heat-conducting material and heated by a locally concentrated heat source serves to close the pot-shaped housing. A pot-shaped cover member also formed of heat conducting material having a collar-shaped marginal edge portion is provided, the cover member and particularly the edge portion thereof bearing upon the edge or marginal portion of the plate member. The space between the pot-shaped cover member and the plate member is at least partially filled with a heat insulating material. The apparatus cell of the instant invention provides a notable advantage in that only one heat source and one thermostat with

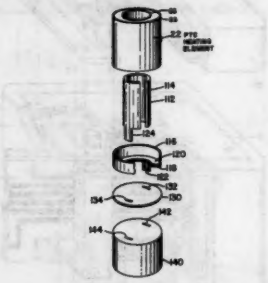
an associated sensor is required, and, in the preferred inventive embodiment, the heat source comprises a transistor mounted upon the plate member, the transistor being connected in the final stage of a thermostat-control amplifier.

3,617,693
COMBINED DINING AND COOKING TABLE
Ron Shimosawa, 230 East Ontario St., Chicago, Ill.
Filed June 19, 1970, Ser. No. 47,642
Int. Cl. H05b 1/00
U.S. Cl. 219—218 9 Claims



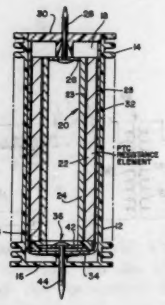
A table which is used for both cooking and dining, characterized by a generally outer annular tabletop which serves as the dining portion of the table and a centrally positioned electrically operated cooking unit positioned inwardly of the outer annular tabletop, said table being constructed so that the people sitting around the table are equidistantly spaced from the center of the table.

3,617,694
ELECTRICAL CONTACT MEANS FOR HAIR CURLER HAVING ELONGATED ANNULAR HEATER
John R. D'Entremont, Foxboro, Mass., assignor to Texas Instruments, Incorporated, Dallas, Tex.
Filed Jan. 27, 1970, Ser. No. 6,094
Int. Cl. A45d 2/36; H05b 1/02, 3/12
U.S. Cl. 219—222 7 Claims



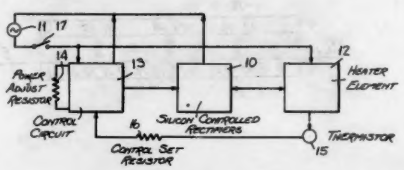
A hair curler employing a heater element formed of a conductive crystalline polymer is disclosed. The polymer, loaded with conductive particles, such as carbon black, has a positive temperature coefficient (PTC) of resistance characteristic and combines a fast warmup time with a slow cooldown time due to the phase change of amorphous polymer to crystalline upon cooling, yet does not become molten due to the sharp rise in resistance at temperatures above an anomaly temperature which limits the heat generation at elevated temperatures. Since the polymer retains its shape, no special sealing means is required to confine it as in prior art fusible wax devices. The heater element is an elongated annulus coated with conductive material on inner and outer peripheral surfaces. A sheet of conductive material is rolled into a cylinder and pressed into the bore of the annulus with a terminal extending therefrom. A sleeve of conductive material is placed about the annulus and a terminal attached to the sleeve to complete electrical connection. The outer shell of the curler extends over the terminal to provide a protected environment.

3,617,695
ELECTRICAL CONTACT MEANS FOR HAIR CURLER HAVING ELONGATED ANNULAR HEATER
John V. Meyer, Brighton, and Richard T. Nordlund, Mansfield, both of Mass., assignors to Texas Instruments, Incorporated, Dallas, Tex.
Filed Jan. 27, 1970, Ser. No. 6,087
Int. Cl. A45d 2/36; H05b 1/02, 3/12
U.S. Cl. 219—222 4 Claims



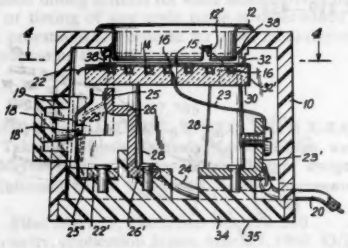
A hair curler employing a heater element formed of a conductive crystalline polymer is disclosed. The polymer, loaded with conductive particles, such as carbon black, has a positive temperature coefficient (PTC) of resistance characteristic and combines a fast warmup time with a slow cooldown time due to the phase change of amorphous polymer to crystalline polymer upon cooling, yet does not become molten due to the sharp rise in resistance at temperatures above an anomaly temperature which limits the heat generation at elevated temperatures. Since the polymer retains its shape, no special sealing means is required to confine it as in prior art, fusible wax devices. An elongated annular PTC heating element is employed with conductive coatings placed on the inner and outer peripheral surfaces thereof. Tubular elements are placed in biased relationship to the conductive coatings with terminals attached to the tubular elements extending from opposite ends of the curler.

3,617,696
HEAT-SEALING APPARATUS
John E. Reenstra, 10 Ronnie Road, Wayne, N.J., and Martin Malone, 27 Sunrise Drive, Hawthorne, N.J.
Filed May 3, 1968, Ser. No. 726,436
Int. Cl. H05b 1/00
U.S. Cl. 219—243 18 Claims



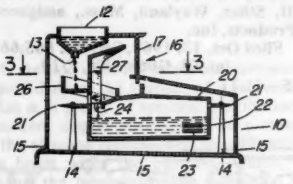
A heat-sealing tray is comprised of a thin sheet of heater element material bonded to an insulating substrate and a rigid backing member. The sheet is etched out in a pattern defining a heating current path. An automatic temperature-limiting control circuit is connected to the sheet. The circuit operates in full wave configuration and controls the partial cycle conduction of current through the heating path. A temperature sensor signals the circuit to remove the current through the path when a predetermined temperature is reached.

3,617,697
CIGARETTE LIGHTER
Robert D. Kahn, Rockville Centre, N.Y., assignor to Fedtro, Inc., Rockville Centre, N.Y.
Filed Mar. 2, 1970, Ser. No. 15,465
Int. Cl. F23g 7/22
U.S. Cl. 219—267 2 Claims



A cigarette lighter is disclosed as including a base member having upright supporting posts extending therefrom for supporting a cigarette-lighting element. The unit includes other construction features providing improved heat dissipation means. Electrical power means and electrical contact means therefor are also included with a housing to cover the entire unit. The housing exposes the cigarette-lighter element and provides a means for operating the electrical contact means.

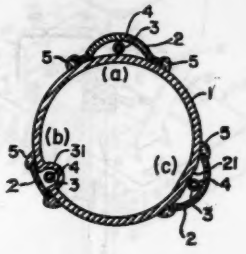
3,617,698
VAPORIZER APPARATUS
Robert H. Duncanson, St. Anthony Village, Minn., assignor to Faberge, Incorporated, New York, N.Y.
Continuation-in-part of application Ser. No. 706,809, Feb. 20, 1968, now Patent No. 3,495,343. This application Feb. 11, 1970, Ser. No. 10,451
Int. Cl. H05b 3/60
U.S. Cl. 219—284 13 Claims



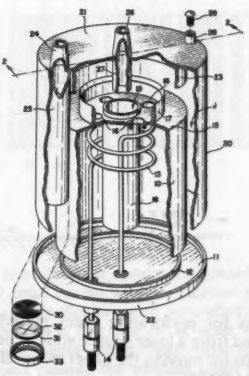
An electrical heater for liquids, particularly an electrode plate water vaporizer, is proofed against electrical shock hazard by insuring that current paths through the liquid into possible contact with the user are elongated, discontinuous, and on filling when the hazard is greatest, are completely interrupted to assure safety even under negligent handling.

3,617,699
A SYSTEM FOR ELECTRICALLY HEATING A FLUID BEING TRANSPORTED IN A PIPE
Donald F. Othmer, 333 Jay St., Brooklyn, N.Y.
Filed Mar. 10, 1969, Ser. No. 805,718
Int. Cl. H05b 3/00; F24j 3/04
U.S. Cl. 219—300 32 Claims

A system for heating a fluid being transported in a pipe includes a ferromagnetic heat-tube coextensive with a section of pipe to be heated. The heat-tube is secured in heat exchange relation to the pipe and has a substantial part of its wall in common with the wall of the pipe. An insulated conductor is disposed within the tube. One end of the conductor is electrically connected to one terminal of an AC source and the other end thereof is electrically connected to an end of the tube. The other end of the tube is electrically connected to the other terminal of the AC source. When alternating current flows through the circuit thus established, it passes only the inner surface of the tube due to the skin effect of the alternating current, thereby generating heat on the inner surface of the tube without current appearing on the outer surface thereof. The heat-tube can be formed by welding a concave strip to the outer cylinder surface of the pipe with the conductor disposed therebetween. Alternatively, the heat-tube can be integrally formed with the pipe as one channel of a two-channel pipe, the other channel being used to transport the fluid. The heat-tube may be helically wound around pipe. The heat-tube is either evacuated or pressurized and means to detect pressure changes indicative of heat-tube leakage is provided.



3,617,700
IMMERSION HEATER
Robert Edward Hooper, Oakville, Ontario, Canada, assignor to Torginol Industries Incorporated
Filed June 2, 1969, Ser. No. 829,516
Int. Cl. F24h 1/10
U.S. Cl. 219—306 8 Claims

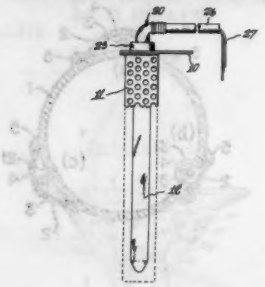


Electrical liquid-heating apparatus for rapid heating of small unit volumes of a liquid such as water in which a unit volume container is provided with a heating element at its upper end, and a partially closed top supports an upper well, heating of the water within the container driving a certain portion of the water upwardly into the well, and a recirculation conduit carries the water from the well downwardly to the bottom of the container, the whole structure being sealed within a housing, water being drawn into the housing and container from an outside source by means of a vacuum, and the heated unit volume of water being drawn off from the container by means of the same vacuum.

3,617,701
ELECTRIC HEATING ELEMENTS

John E. Volker, Pittsburgh, Pa., assignor to Emerson Electric Co., St. Louis, Mo.

Filed Apr. 23, 1970, Ser. No. 31,210
Int. Cl. H05b 1/00
U.S. Cl. 219—336 10 Claims

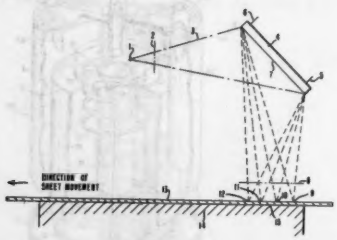


An electric heating element within a quartz tube, the latter having a swivel head connected to one end. The heating element comprises a ceramic core on which a resistance wire is wound helically, the core being formed in sections, each section having a helical groove formed thereon for receiving the resistance wire, the core sections being relatively rotatable to align the helical grooves.

3,617,702
APPARATUS AND METHOD FOR PERFORATING SHEET MATERIAL

Philip Flournoy, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed June 10, 1969, Ser. No. 831,920
Int. Cl. H05b 7/18
U.S. Cl. 219—384 29 Claims



Apparatus for perforating sheet material by means of a beam emitted from a laser source which comprises:

A. a means for moving the sheet material;

B. a laser source;

C. a reflective hologram, said hologram:

1. having its surface prepared in such a manner that it will reflect high-intensity spot images when a beam emitted from the laser source is cast thereon; and

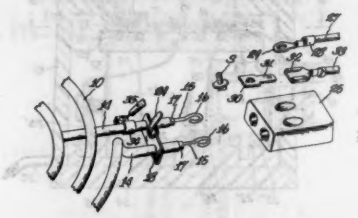
2. being positioned so that it will reflect the high-intensity spot images onto the sheet material; and

D. means for causing the high-intensity spot images to impinge upon certain areas of the sheet material for a duration that is greater than the duration of impingement in other areas, said sheet material areas of greater duration of impingement receiving sufficient energy to cause perforations to be formed therein, and said sheet material areas of lesser duration of impingement receiving impingement in the amount of from no impingement at all to an amount of impingement that contains less than the amount of energy required to perforate the sheet material.

3,617,703
SURFACE-TYPE ELECTRIC HEATING TREATMENT ELEMENTS

William A. Ewart, Jr., Pittsburgh, Pa., assignor to Emerson Electric Co., St. Louis, Mo.

Continuation-in-part of application Ser. No. 791,480, Jan. 15, 1969, now abandoned. This application Aug. 11, 1970, Ser. No. 62,995
Int. Cl. H05b 3/68
U.S. Cl. 219—451 10 Claims

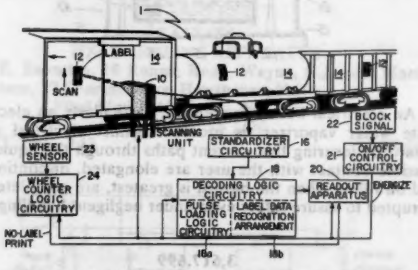


A surface-type electric heating element with terminal pins disposed within opposite ends of a tubular metal sheath and connected to respective ends of the heating resistance within the sheath, compacted refractory material electrically insulating the resistance and terminal pins from the sheath and holding them in position therewithin, each terminal pin extending outwardly from a sheath end and terminating in a loop, the compacted refractory material adequately supporting each terminal pin so that the latter may be twisted along its longitudinal axis whereby the loops may be disposed in selected angular relation to adapt for use with either a plug-in type socket or a screw-type socket. Each terminal pin, at least in the portion subjected to the twisting action, has a Rockwell hardness of about B38 to B55.

3,617,704
SIGNAL-PROCESSING SYSTEM

Christos B. Kapsambelis, Canton, Mass.; Thomas P. Morehouse, Lyndeboro, N.H.; Robert H. Reif, Groton, and Francis H. Stites, Wayland, Mass., assignors to Sylvania Electric Products, Inc.

Filed Oct. 13, 1969, Ser. No. 865,661
Int. Cl. G06k 7/00, 7/10
U.S. Cl. 235—61.11 18 Claims



A coded-vehicle identification system including pulse loading logic circuitry for processing code pulses derived in response to scanning a coded retroreflective label affixed to a vehicle. The label comprises a vertical array of rectangular orange, blue, and white retroreflective stripes, and black nonretroreflective stripes arranged in a plurality of selected stripe-pair code combinations. The individual light patterns successively retroreflected from the stripe-pairs, in response to the individual stripe-pairs being successively scanned with incident light, are converted by standardizer circuitry into corresponding electrical code pulses and applied to pulse loading logic circuitry.

The pulse loading logic circuitry operates to determine the width of each of the code pulses and, if the widths of the pul-

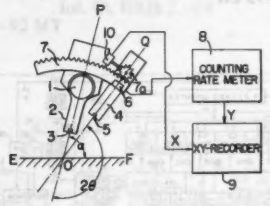
ses satisfy certain preestablished pulse-width criteria for valid label-derived pulses, the code pulses are assumed to be valid label-derived pulses and then loaded into and stored in a plurality of storage shift registers. During various stages of the processing of the code pulses, prior to and following the loading of the code pulses into the storage shift registers, additional time measurement tests are also performed to determine whether the timing of the code pulses satisfies preestablished timing criteria for valid label-derived pulses. If the width or timing of any code pulse is determined not to satisfy the preestablished criteria for valid label-derived pulses, final processing thereof is prevented.

3,617,705

METHOD OF MEASURING STRESS WITH X-RAYS

Hironobu Takano; Hiroshi Tsutsui; Masuo Kifune, and Katsuhiko Miyoshi, all of Kawasaki-shi, Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kanagawa-ken, Japan

Filed Mar. 25, 1969, Ser. No. 810,240
Claims priority, application Japan, Mar. 27, 1968, 43/23498, 43/19454, 43/23499
Int. Cl. G01n *23/20*
U.S. Cl. 250—51.5 **2 Claims**



In the $\sin^2\Psi$ method of X-ray stress measurement, an X-ray beam is projected upon the surface of a material at varying incident angles α, a group of spectral distribution curves for respective incident angles are plotted on rectangular coordinates with the abscissa representing the diffraction angle 2θ of the X-ray beam while the ordinate counts, per second (cps), represents the intensity of the diffracted X-ray beam and the value of $\sin^2\Psi$, peak values (a, b, c, d) of the counts per second of respective distribution curves are determined, values (a', b', c', d') of $\sin^2\Psi$ for respective peak values are calculated, a straight line (a' b' c' d') is drawn by connecting said calculated values of $\sin^2\Psi$, and the slope

$$\frac{\partial 2\theta\Psi}{\partial \sin^2\Psi}$$

of the straight line is measured by means of a special rule.

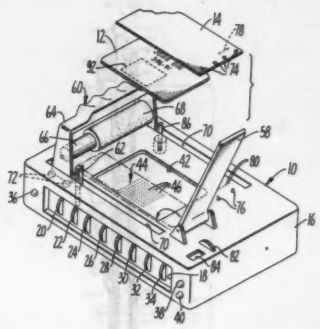
3,617,706

VERIFICATION SYSTEM

George S. Oberhart, San Mateo, Calif., assignor to Cred-X Corporation, San Mateo, Calif.

Filed Aug. 4, 1969, Ser. No. 855,068
Int. Cl. G06k *9/00*
U.S. Cl. 235—61.7 B **5 Claims**

A system employing wire-encoded cards and a card verification machine which is selectively adjustable to establish connection with the wires in a card and complete a circuit therethrough. Adjustment of the machine in accordance with a code establishes a predetermined partial circuit therein which complements a partial circuit provided by the wires in the card. The cards may be of the credit card type and for this purpose the system also includes wire encoded vouchers and a partial circuit within the machine which is adjustable to complement the wire encoding of the voucher. The machine is provided with a circuit interrupter to detect fraudulent



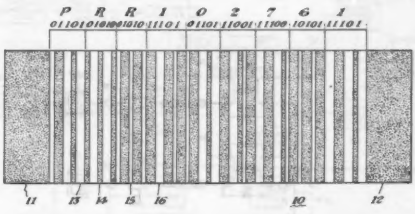
cards and deactivating structure for the printer to prevent misuse of the printer.

3,617,707

AUTOMATIC CAR IDENTIFICATION SYSTEM

Charles B. Shields, Columbus, and Roelif Stapelfeldt, Cleveland, both of Ohio, assignors to Westinghouse Air Brake Company, Swissvale, Pa.

Continuation of application Ser. No. 230,351, Oct. 15, 1962, now abandoned. This application Aug. 17, 1967, Ser. No. 661,468
Int. Cl. G06k *7/10;* **G01n** *21/30*
U.S. Cl. 235—61.11 E **4 Claims**



An automatic identification system for identifying objects passing a wayside point having an identification member consisting of alternative reflective and nonreflective areas in which each of the areas has one of at least two different widths for "logically" signifying in binary form the identity of the particular object passing the wayside point and having a wayside scanning unit including a source of radiant energy directed onto said objects and including photosensitive detecting means responsive to radiant energy reflected from the identification member for producing signals indicative of the particular object passing the wayside point.

3,617,708

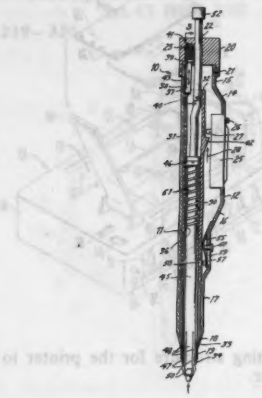
MARKER-COUNTER DEVICE

Anthony S. Bongiovanni, Woodbury, N.J., assignor to Esti-Mate, Inc., Woodbury, N.J.

Filed May 11, 1970, Ser. No. 36,229
Int. Cl. B43k *29/08*
U.S. Cl. 235—64 **4 Claims**

An elongate outer casing having a window and a counter mounted in the casing for presenting numerical indicia

through the window, the casing being provided interiorly with a shiftable mechanism for actuating the counter and including marking means extending exteriorly for marking and depressible to shift the mechanism and actuate the counter.



3,617,709

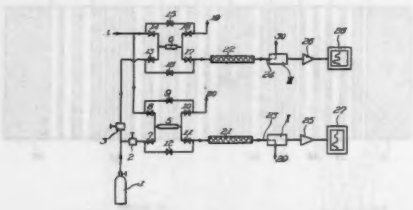
APPARATUS FOR DETECTING FAILURES OF NUCLEAR FUEL ELEMENTS

Hirohito Tone, Naka-gun, Japan, assignor to Nihon Genshiryoku Kenkyusho, Tokyo, Japan

Continuation-in-part of application Ser. No. 511,755, Dec. 6, 1965, now abandoned. This application Mar. 28, 1969, Ser. No. 811,333

Int. Cl. G01t *1/18*

U.S. Cl. 250—83.6 **9 Claims**



An apparatus is provided for detecting failures in nuclear fuel elements. Specific measurement of Krypton and Xenon as gaseous nuclear fission products is achieved by separating these elements from other coexisting radioactive elements and measuring the beta rays emitted from the Krypton and Xenon thus separated with a high counting efficiency. Separation is provided by passing the combined gases through separate columns filled with molecular sieve materials, or activated charcoal, in combination with a carrier Q-gas as used in a gas flow counter.

3,617,710

MULTIPLEX DIGITAL LASER GENERATOR

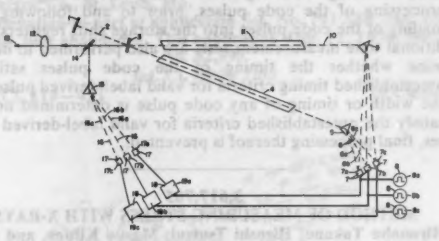
Thomas E. Honeycutt, and John J. Ehrlich, both of Huntsville, Ala., assignors to The United States of America as represented by the Secretary of the Army

Filed Nov. 17, 1969, Ser. No. 877,342

Int. Cl. H04b *9/00*

U.S. Cl. 250—199 **7 Claims**

A laser generator for producing a single laser beam carrying several channels of digital information simultaneously is disclosed. The frequency components of the laser emission are spatially separated inside the generator cavity, and each component is separately pulse-code modulated according to a digital input signal. A simple receiver is also disclosed.



3,617,711

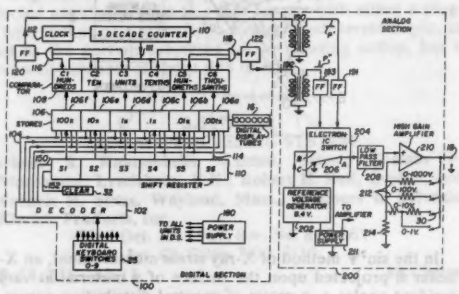
APPARATUS FOR CHANGING A DIGIT OF A STORED NUMBER

Robert C. Smyth, Huntington Beach, N.Y., assignor to Digital Apparatus Corporation, Deer Park, N.Y.

Filed Mar. 27, 1970, Ser. No. 23,300

Int. Cl. G06f *11/00*; H03R *21/00*; G08c *11/00*

U.S. Cl. 235—92 EA **6 Claims**



A high-precision power supply generates voltage with an accuracy of at least 30 parts per million and is comprised of a digital section interconnected with an analog section by pulse transformers. Numbered keyboard switches in the digital section select a desired output voltage which is displayed numerically by electronic digital display tubes. A shift register in circuit with number storage means enables any one of the displayed numbers to be changed without changing any other displayed number. The analog section includes a stable reference voltage generator, electronic switch, filter and a high-gain amplifier which produces an output voltage corresponding to the displayed numbers. The electronic switch passes proportional parts of the reference voltage to the amplifier via the filter under control of pulses received from the digital section. The amplifier is capable of producing current in one of two ranges depending upon the output voltage.

3,617,712

NUMERICAL DISPLAYING APPARATUS

Hitoshi Sone, Chigasaki-shi, Japan, assignor to Kabushiki Kaisha Ricoh, Tokyo, Japan

Filed Apr. 22, 1968, Ser. No. 723,028

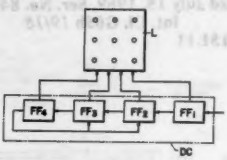
Claims priority, application Japan, Apr. 24, 1967, 42/25856

Int. Cl. G09f *9/00*

U.S. Cl. 235—92 EA **2 Claims**

Binary counters FF1, FF2, FF3, and FF4, which are used in a decimal notation displaying device (L), respectively in-

dicate a numeral which corresponds to 1, 2, 4, and 8. A decimal notation number in the aforesaid displaying device is



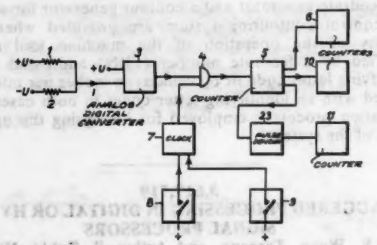
illustrated as a sum of displays which correspond to the aforesaid 1, 2, 4, and 8 respectively.

3,617,713

ARRANGEMENT FOR MEASUREMENT OF TEMPERATURE DIFFERENCE AND HEAT VOLUME

Stig Ingvar Karlsson, Nyhemsvagen, 2, 371 00 Karlskrona, Sweden

Filed Jan. 29, 1969, Ser. No. 794,959
Claims priority, application Sweden, Feb. 27, 1968, 2491/68
Int. Cl. H03k *21/08*
U.S. Cl. 235—92 MT **4 Claims**



Apparatus for measuring a thermal property such as temperature differences or heat quantity in a flowing fluid includes means for generating a current which is proportional to the temperature difference between two points in the fluid. The current is converted by an analog-to-digital converter to a train of pulses whose repetition rate is proportional to the amplitude of the current. These pulses are accumulated by a counter via a gate which is controlled by a further pulse source such as a pulse-generating volumeter.

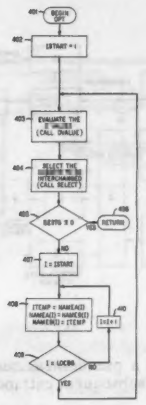
3,617,714

METHOD OF MINIMIZING THE INTERCONNECTION COST OF LINKED OBJECTS

Brian W. Kernighan, North Plainfield, and Shen Lin, Gillette, both of N.J., assignors to Bell Telephone Laboratories Incorporated, Murray Hill, Berkeley Heights, N.J.

Filed Apr. 15, 1969, Ser. No. 816,208
Int. Cl. G06f *9/06*
U.S. Cl. 235—150 **9 Claims**

A method of partitioning the vertices of a graph into sets is disclosed. The method, desirably practiced by using a digital computer program, minimizes the total cost of interconnections between sets using constraints on the maximum number of sets, the maximum number of vertices that can be assigned to any particular set, and the maximum number of connections which can be made to any one set. The method is particularly useful in the layout of circuit components on physical supports such as chassis, printed circuit cards, and semiconductor substrates.

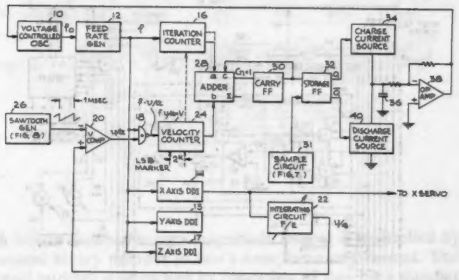


3,617,715

AUTOMATIC ACCELERATION/DECELERATION FOR A NUMERICAL CONTROLLED MACHINE TOOL

Ernst H. Dummermuth, East Cleveland, Ohio, assignor to Allen-Bradley Company, Milwaukee, Wis.

Filed May 4, 1970, Ser. No. 34,206
Int. Cl. G06f *7/38*; G05b *19/18*
U.S. Cl. 235—151.11 **13 Claims**



A system is provided in a numerically controlled machine tool for maintaining constant its acceleration up to a desired velocity and its deceleration at a proper time from said velocity.

3,617,716

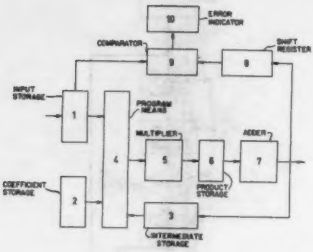
METHOD AND ARRANGEMENT FOR EXTRAPOLATION OF A CONTINUOUS FUNCTION

Hansrichard Schulz, Villingen/Black Forest, Germany, assignor to Saba Schwarzwaelder Apparate-Bau-Anstalt August Schwer Soehne GmbH, Villingen/Black Forest, Germany

Filed Jan. 23, 1969, Ser. No. 794,479
Claims priority, application Germany, Jan. 27, 1968, P 15 74 604.0
Int. Cl. G06f *7/38, 15/34*
U.S. Cl. 235—152 **12 Claims**

Extrapolated values of a continuous function of an independent variable are computed for a given extrapolation range of the independent variable by measuring the function at predetermined values of the independent variable within a measurement range of said variable. The measured values are

combined according to the Lagrange interpolation formula to generate one extrapolated value of the function which is then



stored and used as a pseudomeasurement signal during the computation of the subsequent extrapolated value.

3,617,717

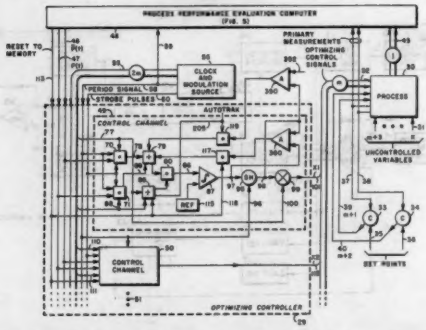
OPTIMIZING CONTROL SYSTEMS

Lawrence R. Smith, Phoenix, Ariz., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation-in-part of application Ser. No. 770,284, Oct. 24, 1968, now abandoned. This application Apr. 28, 1969, Ser. No. 819,877

Int. Cl. G05b *13/02*

U.S. Cl. 235—151.1 **46 Claims**



Orthogonal Modulations of process control variables produces modulation of a performance indicating signal. This performance indicating signal is processed to generate a plurality of control signals indicative of direction and magnitude of change of a process control variable toward obtaining optimum performance. Each control signal results from multiplying the performance indicating signal by its respective modulation signal followed by integration and a sample and hold circuit. Primary control signals may be imposed on the process control with the optimumly controlled variables interacting with such primary control through process interactions. The integrated control signals are sampled during time periods small with respect to the shortest time period of the orthogonal modulation. The process control permits the process being controlled to settle down after each optimum control period. Adaptive feedforward techniques are described. Phase reversal of modulation between successive measurements improves noise immunity. Random noise modulation of frequency of modulation and phase reversals also increases noise immunity.

3,617,718

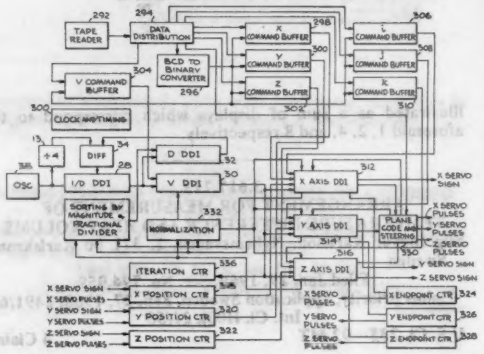
NUMERICAL CONTROL CONTOURING SYSTEM WHEREIN DESIRED VELOCITY INFORMATION IS ENTERED INTO THE SYSTEM INSTEAD OF FEEDRATE NUMBER

Ernst H. Dummermuth, East Cleveland, Ohio, assignor to Allen-Bradley Company, Milwaukee, Wis.

Filed July 15, 1969, Ser. No. 841,846

Int. Cl. G05b *19/18*

U.S. Cl. 235—151.11 **23 Claims**



A feedrate generator and a contour generator for a numerical control contouring system are provided wherein the velocity of the operation of the machine tool may be specified by a feedrate number (FRN) addressed with an identifying letter code or by velocity in inches per minute addressed with an identifying letter code. In both cases a normalization process is employed for increasing the operating speed of the system.

3,617,719

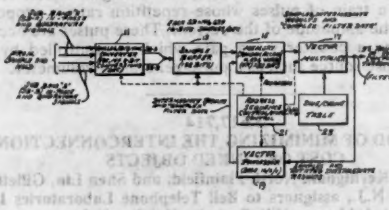
STAGGERED PROCESSING IN DIGITAL OR HYBRID SIGNAL PROCESSORS

Sung Y. Wong, Tarzana, and Arthur S. Zukin, Woodland Hills, both of Calif., assignors to The United States of America as represented by the Secretary of the Air Force

Filed Mar. 11, 1970, Ser. No. 18,585

Int. Cl. G06t *7/38*

U.S. Cl. 235—152 **2 Claims**

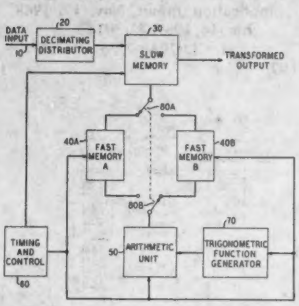


A digital processor of analog in phase and quadrature signals in which the signals are converted to digital form, fed to a sample buffer and then applying the novel means for feeding the signals to a random access memory in staggered sequence. A predetermined number of loops is made with each loop consisting of a vector multiplier, a vector processor, and a return to the memory. Upon completion of the loops, the output is read out from the vector multiplier.

3,617,720
FAST FOURIER TRANSFORM USING HIERARCHICAL STORE

William M. Gentleman, Summit, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sept. 12, 1967, Ser. No. 667,113
Int. Cl. G06f 7/38
U.S. Cl. 235—156 10 Claims

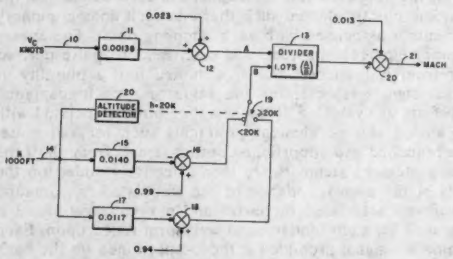


Methods and apparatus for performing fast Fourier transforms corresponding to a sequence of input data signals are described. Efficient allocation and buffering of a small high-speed memory within a hierarchical memory system permits computations to proceed at a rate approximating that available with a single large store operating at the speed of the high-speed memory.

3,617,721
MACH COMPUTATION FROM ALTITUDE AND CALIBRATED AIRSPEED

Jimmie L. Foster, Granada Hills, Calif., assignor to Collins Radio Company, Cedar Rapids, Iowa

Filed Oct. 13, 1969, Ser. No. 865,843
Int. Cl. G06g 7/78
U.S. Cl. 235—150.2 11 Claims



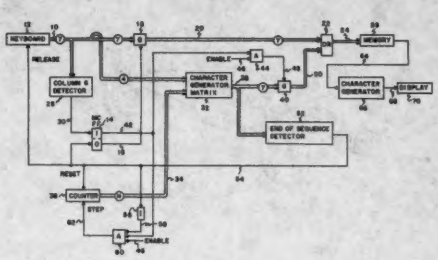
Mach number, as defined in terms of barometric altitude and calibrated airspeed, is a complex nonlinear relationship. A method and means for deriving Mach number by linear analogue computation from altitude and airspeed is described. Selected linear techniques involving one or more straight line approximations reduce the computation to one or more linear functions and an ordinary dividing operation which may be readily implemented by electronic analogue computation.

3,617,722
MULTIPLE-CHARACTER GENERATOR

Stephen A. Grosky, Monroe, Conn., assignor to The Bunker-Ramo Corporation, Stamford, Conn.

Filed Oct. 8, 1969, Ser. No. 864,765
Int. Cl. H04l 3/02
U.S. Cl. 235—154 10 Claims

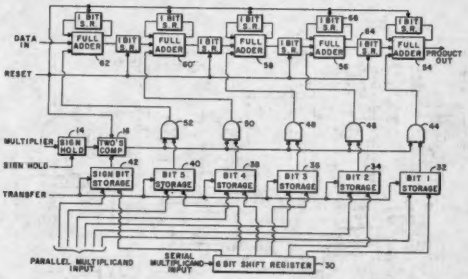
A circuit for converting a single coded input character into a plurality of coded output characters by applying a portion of the coded input character to a character generator device and deriving the remaining inputs to the character generator device from a counter which is incremented each time an output character is generated. The multiple character sequence is terminated when a predetermined output is obtained from the character generator.



3,617,723
DIGITALIZED MULTIPLIER

William J. Melvin, Costa Mesa, Calif., assignor to Collins Radio Company, Dallas, Tex.

Filed Feb. 25, 1970, Ser. No. 14,151
Int. Cl. G06f 7/39, 7/52
U.S. Cl. 235—164 12 Claims



A binary number in sign-magnitude format is multiplied by a second binary number in two's complemented format. The second number is stretched by repeating its sign bit a number of times equal to the number of magnitude bits of the first number, and the second number is then two's complemented when said first number is negative. Gate means controlled by said second number provides summing means with said first number. Said summing means develops the partial product and final product of the multiplication.

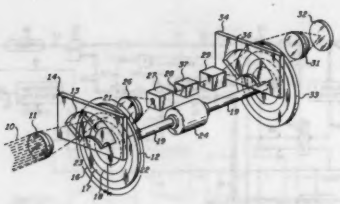
3,617,724
SHIFTED SEQUENCE PSEUDO RANDOM CODED RETICLE CORRELATION APPARATUS

Stephen G. McCarthy, Dobbs Ferry; Irving Roth, Williston Park, and Edward W. Stark, Garden City, all of N.Y., assignors to Sperry Rand Corporation

Filed Apr. 4, 1968, Ser. No. 718,751
Int. Cl. G06f 15/34
U.S. Cl. 235—181 6 Claims

Optical radiant energy encoding and correlating apparatus for eliminating correlation residues including a movable reticle with a plurality of continuous loop tracks each having the same pseudo random code formed thereon for encoding incident radiation and means for correlating the encoded data with a plurality of phase shifted replicas of the pseudo random code, the code in each reticle track being shifted rela-

tive to the adjacent tracks by an amount equal to the width of the field focused on the reticle and a sufficient number of



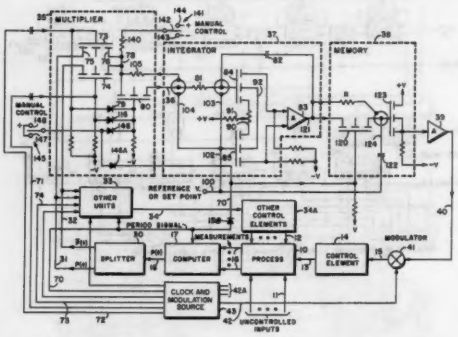
tracks being provided so that the periphery of the field encompasses a complete code.

3,617,725

CONTROL CHANNEL FOR AN OPTIMIZING CONTROL SYSTEM

Lawrence R. Smith, Phoenix, Ariz., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 24, 1968, Ser. No. 770,288
Int. Cl. G06g 7/18, 7/66
U.S. Cl. 235—183 **8 Claims**



A control channel circuit for a control system utilizing more than one channel is disclosed wherein orthogonal modulation signals are provided for each control channel. In each control channel circuit an analog voltage signal corresponding to the gradient of the process performance indicating signal for the particular process variable is obtained by sequentially gating positive and negative pulses to an integrator circuit. The pulses which correspond to the performance indicating signal and its complement accumulate in the integrator circuit to give their net sum.

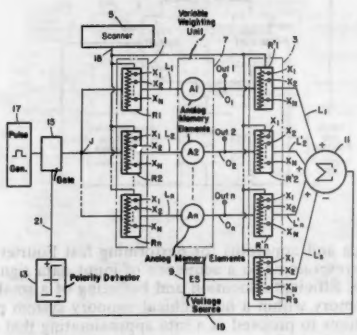
The net sum determines whether that process variable is at optimum and if not, the net sum is used, through a memory circuit, for subsequently controlling the process variable. The net sum is updated or improved at predetermined intervals to move the process variable toward optimum. The integrator circuit has a long time-constant of integration so that the integration is independent of the base period. Both the storage capacitor of the integrator circuit and the memory capacitor of the memory circuit, as well as the other components of the circuit, are such that leakage from the capacitors is essentially zero whereby the analog voltage values thereon are maintained for as long a period of time as is needed which may be hours or even days.

3,617,726

AUTOMATIC WAVEFORM ANALYZING APPARATUS FOR OBSERVING ARBITRARY WAVEFORMS BY THE SYNTHESIS OF A PLURALITY OF OPTIMUMLY WEIGHTED FUNDAMENTAL WAVEFORMS

Yushi Uchida; Mineki Watanabe; Sadamu Ohteru, and Hiroshi Kobayashi, all of Tokyo, Japan, assignors to Nippon Electric Company Limited, Minato-ku, Tokyo, Japan

Filed Nov. 17, 1969, Ser. No. 877,273
Claims priority, application Japan, Nov. 17, 1968, 43/83877, Jan. 14, 1969, 44/3014
Int. Cl. G06g 7/26
U.S. Cl. 235—197 **10 Claims**



Automatic waveform analyzing apparatus for deriving arbitrary waveforms by the synthesis of a plurality of optimumly weighted fundamental waveforms whose optimum weighting factors are determined by repeatedly sampling said plurality of fundamental waveforms at a plurality of sampling points and modifying previously established values for such weighting factors in response to values obtained at each sampling point is provided in accordance with the teachings of the present invention. In the automatic waveform analyzing apparatus according to the present invention, a plurality of analog memory elements are disposed in accordance with the sampling points selected such that one such analog memory elements is associated with each sampling point. The analog memory elements are read and each readout pulse derived therefrom is branched and apportioned into a plurality of output signals representing the value of each fundamental waveform as evaluated at the sampling point associated with the analog storage element producing such readout pulse. The branched and apportioned output signals from all of the analog memory elements are then selectively added on the basis of the correspondence of the associated fundamental waveforms associated therewith and a summation signal is produced for each fundamental waveform relied upon. Each summation signal produced is then apportioned on the basis of the value of the fundamental waveform associated therewith at each of the sampling points selected. Such apportioned values are then selectively added and compared to corresponding values of the arbitrary waveform. The analog storage element associated with the sampling point at which the selective addition and comparison has taken place has its contents selectively modified. This operation is repeatedly performed at each sampling point until the selective comparison indicates that an equivalent waveform has been synthesized.

3,617,727

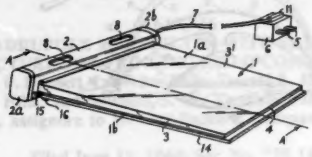
ILLUMINATING DEVICE WITH A RECHARGEABLE BATTERY OR A MAINS SUPPLY POWER SOURCE

Stanley Balfour-Lynn, 6a Palace Gate, London, W.8., England

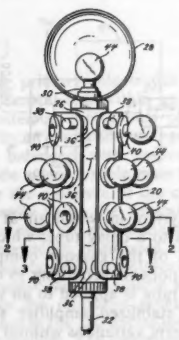
Filed Aug. 9, 1968, Ser. No. 751,578
Int. Cl. F21l
U.S. Cl. 240—1 R **10 Claims**

This disclosure relates to an illuminating device, primarily for use as a book reader, in which a slightly tapering trans-

parent sheet is illuminated edgewise by low-intensity lamps in a housing extending along its thicker edge. The sheet is placed flat against the book page to be read, the page being illuminated by light internally reflected from the front surface of the transparent sheet and being read through the transparent sheet. Circuits are described for alternatively energizing the lamps from the mains supply and a rechargeable battery.



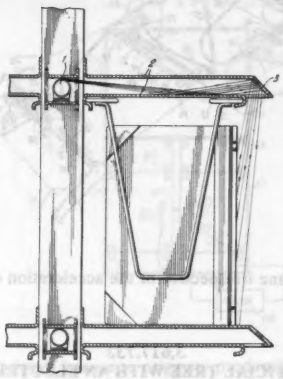
3,617,728
FLASHBULB-HOLDING ATTACHMENT
Milo F. Mracek, 22 Morwood Lane, Creve Coeur, Mo., and David J. Black, 10156 Camshire Court, Saint Ann, Mo.
Filed Sept. 22, 1969, Ser. No. 859,884
Int. Cl. G03b *15/03*
U.S. Cl. 240—1.3 **14 Claims**



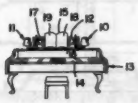
A perforate support, which is securable to the battery housing of a flash gun, has resilient grommets mounted within the openings thereof to releasably hold flashbulbs.

3,617,729
ARRANGEMENT FOR THE ILLUMINATION OF OBJECTS PLACED UNDERNEATH OR ON SHELVES
Flemming Lassen, Kaasalle 15, 2900 Hellerup, and Per Lassen, Bernstarfflundalle 64, 2920 Charlottenlund, both of Copenhagen, Denmark
Filed Sept. 18, 1969, Ser. No. 859,130
Claims priority, application Denmark, Sept. 19, 1968, 4506/68
Int. Cl. A47b *63/00*; **F21v** *7/22, 7/10*
U.S. Cl. 240—2 AD **10 Claims**

This is a device for effecting illumination of objects located underneath or upon shelves. A construction comprising light source along the rear edge of the hollow shelf directs light through the shelf between its upper and lower members and this shelf has a reflector on its front edge for directing the light downwardly toward the books or objects located on a bottom shelf so that their titles can be easily read.



3,617,730
LIGHTING ARRANGEMENT FOR KEYBOARD INSTRUMENTS
Sergei I. Mihailoff, 2820 Baker St., San Francisco, Calif.
Division of Ser. No. 741,000, June 28, 1968. Filed Feb. 16, 1970, Ser. No. 14,839
Int. Cl. A47b *97/00*
U.S. Cl. 240—4 **7 Claims**

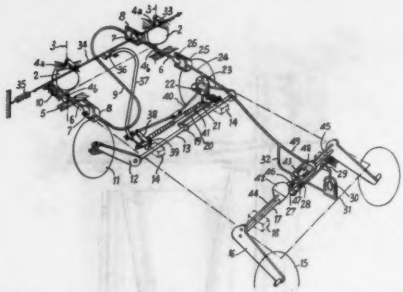


A piano lighting arrangement comprising two lamp fixtures, one on each side of the piano music rack and each supported by the piano, each lamp fixture having a light bulb and means providing an opaque portion which protects the player's eyes from the direct light of its bulb, while the light shines on the music rack to illuminate written music thereon and on the keyboard to illuminate the keys.

3,617,731
ADJUSTABLE LIGHTING EQUIPMENT FOR ROAD VEHICLE
Jacques Fleury, Paris, France, assignor to Societe Anonyme Automobiles Citroen, Paris, France
Filed Feb. 24, 1969, Ser. No. 801,285
Claims priority, application France, Feb. 28, 1968, 3471
Int. Cl. B60q *1/12*
U.S. Cl. 240—8.25 **4 Claims**

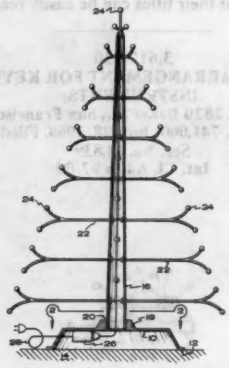
A road vehicle has head lamps pivotally mounted to illuminate the road round a curve as the vehicle moves into the curve. The lamps are also pivotal about horizontal axes to compensate for relative height of the vehicle structure at the front and the rear and also to compensate for roll. In a

modification a device sensitive to acceleration or deceleration is also effective to maintain the lamp beams in a preset



horizontal plane irrespective of the acceleration or deceleration.

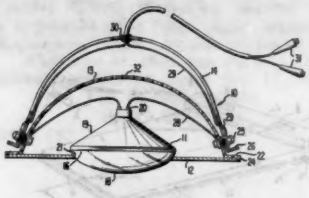
3,617,732
ARTIFICIAL TREE WITH AN ELECTRICAL ILLUMINATING SYSTEM
Royal P. Fisher, Salt Lake City, Utah
Filed Nov. 19, 1969, Ser. No. 878,138
Int. Cl. A47g *33/16*
U.S. Cl. 240—10 T **8 Claims**



An artificial tree having a support base, a trunk member removably connected to the base with connection means for supporting the trunk outwardly away from the base's support surface, a limb member connected to the trunk member, an electric light secured to the limb member and electrically connected to power supply means regulated with voltage reduction means connected to the tree's base. The electric light can be directly connected to the trunk member and the tree's base can include means for rotating the trunk member.

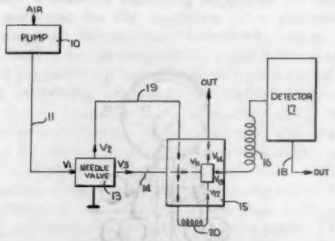
3,617,733
FLOATING UTILITY LIGHT
Bob R. Adams, Bird-Adams, Co., Inc., P.O. Box 38, Doraville, Ga.
Filed June 10, 1968, Ser. No. 735,764
Int. Cl. F21v *31/00*
U.S. Cl. 240—26 **5 Claims**

A floating utility light including a light bulb and a housing including a frame defining a central aperture through which the enlarged portion of the light bulb protrudes, and a concave section connected at its periphery to the edges of the frame and extending over the rear portion of the light bulb to which the electrical connections are made. The housing is substantially water impervious and is of low profile so that it floats with the portion of the bulb extending through the aperture of the frame immersed in water. The concave portion of the housing is translucent, so that when the light bulb is illuminated, the concave portion of the housing will glow



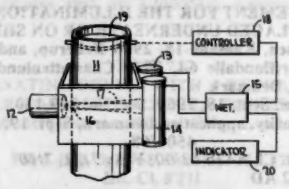
or emit dispersed light, while a beam of light will be directed into the water. An arcuate handle is connected at its ends to the concave housing for convenience in retrieving the utility light from the water and for handling the light in other situations.

3,617,734
DETECTION SYSTEM FOR MONITORING GASEOUS COMPONENTS IN AIR
Julian H. Chaudet, Fairfax, Va.; Harold G. Eaton, Jr., Washington, D.C., and Victor R. Huebner, Diamond Bar, Calif., assignors to Melpar, Inc., Falls Church, Va.
Continuation-in-part of application Ser. No. 324,071, Nov. 15, 1963. This application June 7, 1967, Ser. No. 644,205
Int. Cl. H01j *37/00*
U.S. Cl. 250—43.5 **6 Claims**



A gas detection system in which air at near atmospheric pressure is pulse fed to a delay tube, which, because of difference in diffusion of the gaseous components, separates each pulse into components according to diffusion rate. The output of the delay tube is applied to an ionization detector having a feedback stabilized amplifier system capable of compensating long term variations without affecting the short pulses, for sensing the presence of a gas or gases of interest.

3,617,735
MATERIAL LEVEL DETECTOR
David J. Shoemaker, Columbus, Ohio, assignor to Industrial Nucleonics Corporation
Filed Aug. 13, 1968, Ser. No. 771,688
Int. Cl. G01n *23/12*
U.S. Cl. 250—43.5 **13 Claims**



A level detector for fluent material in a receptacle or conduit includes a gamma ray source and detector means for

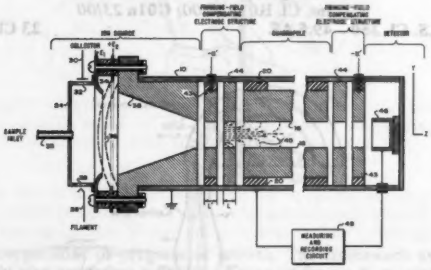
deriving a signal indicative of the amount of radiation absorbed by the material. The output of the detector is fed to a pair of channels, each including a comparator network having a different reference input. The comparator channels together feed a logic network whereby a deadband is established between material levels related to the reference inputs to the comparators.

3,617,736

QUADRUPOLE MASS FILTER WITH ELECTRODE STRUCTURE FOR FRINGING-FIELD COMPENSATION

Edward F. Barnett, Los Altos Hills; Donald L. Hammond, Los Altos Hills, and William S. W. Tandler, Palo Alto, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed June 19, 1968, Ser. No. 738,142
Int. Cl. H01j *39/34*
U.S. Cl. 250—41.9 10 Claims



Four parallel primary electrodes are symmetrically disposed about a central axis within an electrically conductive housing operated at a reference potential. These electrodes are driven by an excitation voltage comprising AC and DC components balanced with respect to the reference potential to provide a quadrupole mass filter. An ion source is positioned near the entrance of the quadrupole for transmitting ions generally along the central axis toward an ion detector positioned near the exit of the quadrupole. A pair of electrodes is symmetrically positioned about the central axis between the ion source and the entrance of the quadrupole. The electrode nearest the ion source is operated at a DC voltage referred to the reference potential and maintained directly proportional to the DC excitation voltage component applied to the quadrupole. The electrode nearest the quadrupole is operated at a fixed DC voltage referred to the reference potential. A similar pair of electrodes is also employed between the ion detector and the exit of the quadrupole.

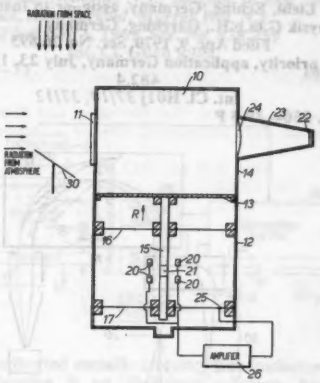
3,617,737

RADIOMETER APPARATUS COMPRISING A VOLUME OF GAS WHOSE PRESSURE IS CYCLICALLY VARIED

John Theodore Houghton; Guy Denton Peskett; Clive Douglas Rodgers, and Fredric William Taylor, all of Oxford, England, assignors to National Research Development Corporation, London, England

Filed July 9, 1969, Ser. No. 840,194
Int. Cl. G01n *21/26*; G01j *5/10*
U.S. Cl. 250—43.5 R 13 Claims

The invention concerns apparatus for detecting radiation emitted from a quantity of gas, said apparatus comprising a chamber containing a predetermined amount of a given component of said gas having absorption lines in a band of the emission spectrum, means for cyclically varying the pressure of said component in said chamber, and detector means adapted to provide an output signal which is dependent on the radiation intensity wavelengths of the absorption lines or at predetermined wavelengths in the region thereof, said wavelengths being such that the absorption coefficients of the gas at all detected wavelengths are substantially the same,



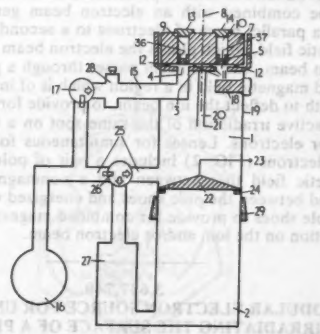
and the radiation is known to originate predominantly from a particular region of the said quantity of gas.

3,617,738

AN ELECTRONIC ENERGY SAMPLE ANALYSIS DEVICE

Yvan Louis Houbart, Chenee, Belgium, assignor to U. S. Philips Corporation, New York, N.Y.

Filed Sept. 17, 1968, Ser. No. 760,149
Claims priority, application Luxembourg, Sept. 18, 1967, 54 494
Int. Cl. H01j *37/26*
U.S. Cl. 250—49.5 4 Claims



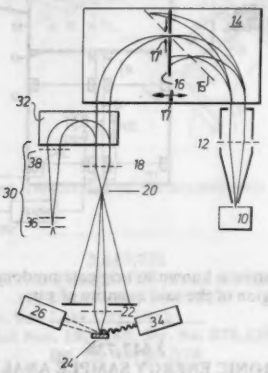
An apparatus for analysis of a sample by bombardment under high vacuum (10^{-5} mm.Hg.), wherein the sample is received in a rotatable turret having two through bores which sealingly mate alternately with two apertures. One of these apertures communicates directly with an enclosure under high vacuum and the sample is bombarded therethrough, and the other aperture leads to a conduit adapted to be alternately vented to atmosphere and then reduced to an intermediate vacuum level (e.g., 10^{-3} mm.Hg.). The aperture is vented to enable a sample holder to be removed and clamped and the intermediate level is then reached. The turret is then rotated to interchange the position of the through bores. During the rotation the through bore with the fresh sample is briefly opened into a further aperture leading by a conduit into the evacuated enclosure at a point remote from the bombardment zone so that the through bore is evacuated without significantly affecting the vacuum near the bombardment zone.

3,617,739

ION LENS TO PROVIDE A FOCUSED ION, OR ION AND ELECTRON BEAM AT A TARGET, PARTICULARLY FOR ION MICROPROBE APPARATUS

Helmut Liebl, Eching, Germany, assignor to Institut fur Plasmaphysik G.m.b.H., Garching, Germany

Filed Apr. 9, 1970, Ser. No. 26,893
Claims priority, application Germany, July 23, 1969, P 19 37 482.4
Int. Cl. H01j *37/14, 37/12*
U.S. Cl. 250—49.5 P **12 Claims**



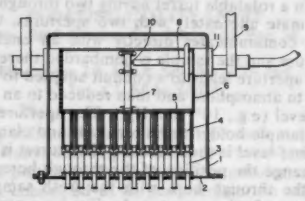
An ion lens (12) is located between an ion source (10) and the magnetic sector field of an ion microprobe apparatus, the ion lens having its input focal plane in the region in which the ion beam emitted by the ion source has its smallest cross section, the magnetic sector field being a uniform homogeneous 180° magnetic field in which the ions emitted from the ion lens (12) as parallel bundles are first deflected by 90°, then passed through an aperture for selection of ions of predetermined mass, and again deflected by 90°, to be emitted as parallel bundles of ions of preselected mass. The microprobe may be combined with an electron beam generator which emits a parallel beam of electrons to a second uniform 180° magnetic field, which places the electron beam coaxially with the ion beam. The ion beam passes through a portion of this second magnetic field in a region which is of insufficient field strength to deflect the ion beam, to provide for simultaneous, or selective irradiation of the same spot on a test sample by ions or electrons. Lenses for simultaneous focusing of ions and electrons (FIG. 2) includes a pair of pole shoes with a magnetic field therebetween and a nonmagnetic electrode located between the pole shoes and energized with respect to the pole shoes to provide for combined magnetic and electrical action on the ion, and/or electron beam.

3,617,740

MODULAR ELECTRON SOURCE FOR UNIFORMLY IRRADIATING THE SURFACE OF A PRODUCT

Brian Skillicorn, Topsfield, Mass., assignor to High Voltage Engineering Corp., Burlington, Mass.

Filed Oct. 8, 1968, Ser. No. 765,846
Int. Cl. G01n *21/00*
U.S. Cl. 250—49.5 **13 Claims**



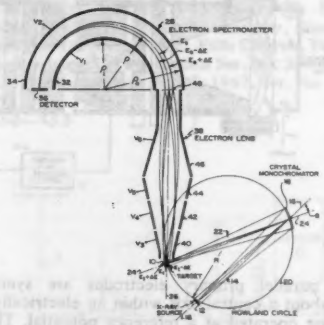
The invention relates to the irradiation of coatings and similar materials wherein a relatively large surface of complex shape is to be irradiated. The invention employs a modular construction wherein each module comprises a relatively small and independently movable electron accelerator which is complete but for the provision of the accelerating voltage. In general, apparatus is used having a common insulating housing and a common voltage source. In the housing are mounted independently movable electron accelerators. A multiplicity of these accelerators is arranged so as to provide a wide array of generally parallel electron beams which are positioned so as to overlap at the surface of the product to be irradiated. Depending upon the nature of the surface, the electron beams may or may not be actually parallel, the purpose being to insure that each electron beam impinges on the surface to be irradiated normal thereto.

3,617,741

ELECTRON SPECTROSCOPY SYSTEM WITH A MULTIPLE ELECTRODE ELECTRON LENS

Kai M. B. Siegbahn, Uppsala, Sweden, and Edward F. Barnett, Los Altos Hills, Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Sept. 2, 1969, Ser. No. 854,437
Int. Cl. H01j *37/00*; G01n *23/00*
U.S. Cl. 250—49.5 AE **23 Claims**



A source of X-radiation and a target under study are mounted on the Rowland circle of a crystal monochromator employed to focus a characteristic line of the X-radiation on the target. An electron lens with four electrodes for providing three independently variable electrical parameters is mounted in the photoelectron path between the target and an electron spectrometer adjusted to focus photoelectrons within a fixed energy range on a detector. The electrical parameters of this electron lens are adjusted to provide a target image of constant size and position at the entrance of the electron spectrometer while accelerating or decelerating photoelectrons from the target into the energy range for which the electron spectrometer is adjusted.

ERRATA

For Classes 250—51.5, 250—83.6 and 250—199 see: Patent Nos. 3,617,705, 3,617,709 and 3,617,710

3,617,742

PANORAMICLIKE DENTAL ARCH X-RAY APPARATUS

Martin L. Schulman, 4100 Cathedral Ave. N.W., Washington, D.C., and Thomas M. Howard, Jr., 13631 Nichols Drive, Clarksville, Md., assignors to Dental Corporation of America, Rockville, Md.

Filed May 8, 1969, Ser. No. 823,121
Int. Cl. G03b *41/16*
U.S. Cl. 250—61.5 **17 Claims**

The obtention of a panoramiclike radiograph of the upper and lower dental arches composed from overlapping exposures of X-rays directed successively at different angles from

the back of the patient's head towards a forwardly disposed extra-oral film supported on a vertically adjustable framework assembly which includes a laterally movable holder for the film as well as a fixed reference plate for positioning within the patient's mouth at the occlusal plane between the upper and lower dental arches. The plate within the patient's mouth constitutes a reliable stabilizing device against movement during exposure and presents a constant plane of reference in successive radiographs by the dentist

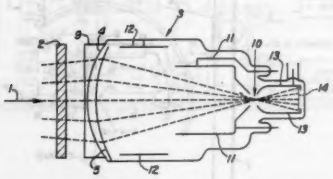
for comparisons of progress or growth. The framework assembly also comprises a fixator or support for an X-ray unit which may be shifted angularly and rectilinearly and is indexed at predetermined positions to make possible a rapid setting of the components while the patient remains fixed, for obtaining radiographs of consistently excellent characteristics despite variations in the shape and size of the patient's head and dental arches.

3,617,743

X-RAY IMAGE CONVERTORS UTILIZING LANTHANUM AND GADOLINIUM OXYHALIDE LUMINESCENT MATERIALS ACTIVATED WITH TERBIUM

Jacob G. Rabatin, Chardon, Ohio, and Robert A. Sieger, Greenfield, Wis., assignors to General Electric Company

Filed Oct. 23, 1968, Ser. No. 769,894
Int. Cl. G01t *1/20*; H01j *31/50*
U.S. Cl. 250—71 **12 Claims**



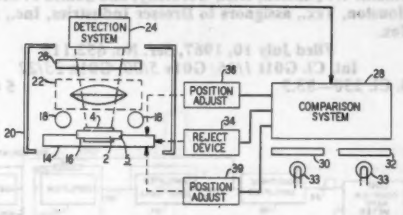
Oxyhalides of lanthanum and gadolinium, including the oxychlorides, oxybromides, and oxyiodides, activated with terbium and optionally sensitized with cerium are found to be some of the most efficient oxygen-dominated phosphors known, having radiant efficiencies with excitation by cathode rays of the same order of magnitude as the best sulfide phosphors. In the conversion of X-rays to visible light, these phosphors are superior in their conversion efficiency to the known X-ray phosphors. These new phosphors are useful in X-ray image-intensifier tubes, in fluoroscopic screens, in radiographic intensifier screens, in lamps and in cathode-ray tubes.

3,617,744

METHOD AND APPARATUS FOR CIRCUIT MODULE TESTING BY COMPARISON OF A FLUORESCENT IMAGE WITH A STANDARD PATTERN

Carleton D. Irish, Neptune, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 1, 1969, Ser. No. 838,259
Int. Cl. G01b *9/08*
U.S. Cl. 250—71 **10 Claims**



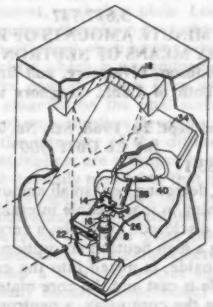
Substrate-supported metallic circuitry is manufactured and tested, by forming it on dielectric substrate having a fluorescent character and irradiating the substrate with ultraviolet light. The resulting shadow image of the metallic circuitry is then superimposed on the negative image of a test mask shaped according to the desired circuitry configuration. The negative image of the circuitry is also superimposed upon the positive image of the mask. Passage of light through the superimposed images indicates defects.

3,617,745

PHOTOMETER RADIOMETER IRRADIANCE REFERENCE SOURCE

John C. Reed, Santa Barbara, Calif., assignor to The United States of America as represented by the Secretary of the Army

Filed May 19, 1970, Ser. No. 38,821
Int. Cl. G01g *5/10*
U.S. Cl. 250—83.3 H **1 Claim**



An improved photometer radiometer for use in detecting targets in clear nighttime sky in which a conventional supercooled irradiance reference source is replaced with a reflective mirror operating at ambient temperature. The mirror is positioned to rereflect irradiance from a supercooled photometer detector back into the detector. The mirror will rereflect an irradiance back into the detector according to the natural irradiance emitted from the supercooled detector, and thus the mirror appears as a supercooled irradiance reference source. The improvement further includes an infrared reference source that is adaptable for emitting a range of irradiances. The source is positioned behind a small hole in the center of the mirror for combining its irradiance with the rereflected irradiance from the cooled detector. A constant speed reflective chopper blade alternately switches the combined irradiances with incoming background irradiance within the field of view of the radiometer for comparison in

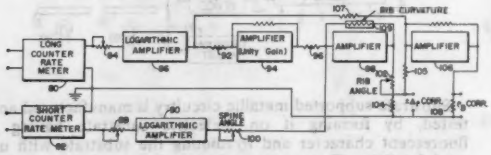
the photometer detector. The irradiances will null the output of the detector when no target is within the field of view of the radiometer in clear nighttime sky. After the radiometer output is nulled, irradiance from a target may be measured with extreme accuracy.

3,617,746

DUAL DETECTOR-COMPENSATED DENSITY WELL-LOGGING SYSTEM

Hermann W. Janssen, Kiel, Germany, and James F. Mooring, Houston, Tex., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed July 10, 1967, Ser. No. 652,115
Int. Cl. G01t 1/16; G01v 5/00; G01n 23/22
U.S. Cl. 250—83.3 **5 Claims**



A density well-logging-compensation system wherein the outputs of the two detectors, which are spaced different distances from a gamma ray source, are applied to temperature-compensated logarithmic amplifiers the outputs of which are compared to derive a correction signal which is employed to correct the output of one of the detectors to give true formation density. In connection with the spine and ribs plot of such a system, provision is made for adjusting both the spine angle and the rib angle so that the compensation system may be employed with density-logging tools of different geometries and physical dimensions. Furthermore, provision is made for compensation for curvature of the rib with increasing mud cake thickness. Facilities are also provided for holding the source end of the logging instrument against the borehole wall to minimize errors in the compensated output of the system.

3,617,747

DETECTING MINUTE AMOUNTS OF RESIDUAL CORE MATERIAL BY MEANS OF NEUTRON RADIOGRAPHY

Charles D. Wilkinson, Livermore, and Bruce C. Meyer, Los Altos Hills, both of Calif., assignors to General Electric Company

Filed Sept. 26, 1968, Ser. No. 762,949
Int. Cl. G01t 3/00
U.S. Cl. 250—83.1 **6 Claims**

A method of detecting very small amounts of residual core material remaining in inaccessible internal passages in a cast metal article is disclosed. Typically, a very small amount of a material having a high neutron absorption cross section, such as gadolinium oxide, is mixed into the core material. After the metal article is cast and the core material removed, such as by dissolving the core away, a neutron radiograph of the article is prepared. Any remaining particles of the doped core material are very distinctly visible in the radiograph. This system is capable of detecting about 0.5 milligram particles.

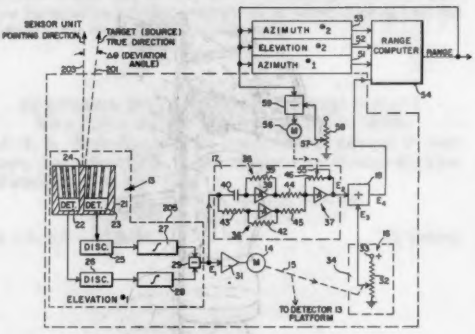
3,617,748

ANGLE TRACKER WITH CORRECTION MEANS HAVING TRANSFER FUNCTION INVERSELY RELATED TO SENOR TRANSFER FUNCTION

Henry Roy Chope, Columbus, Ohio, assignor to Industrial Nucleonics Corporation

Filed May 1, 1968, Ser. No. 725,873
Int. Cl. G01t 1/17
U.S. Cl. 250—83.3 **13 Claims**

A position tracker that is arranged in one embodiment for use with a nucleonic source includes a sensor unit having a nucleonic detector for deriving a signal indicative of the deviation angle between the sensor unit pointing direction and the direction of the nucleonic source. The sensor unit output is fed in parallel to motive means for driving the sensor unit, to reduce the signal and to a correction network for deriving another signal directly proportional to the deviation angle. The correction network has a transfer function that is the reciprocal of the transfer function of the sensor unit. An indication of the sensor unit pointing direction is summed



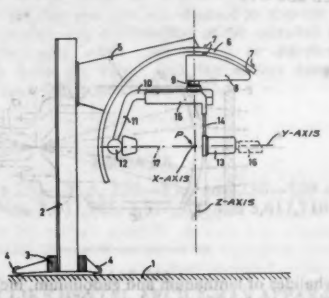
with the output of the correction network to derive a signal directly proportional to the true or actual direction of the source. The true angle indication is combined with other similar signals in a computer, the output of which is a signal proportional to the range between the source and sensor unit. The range indication is fed back to the correction network to control the gain factor thereof.

3,617,749

COLUMN SUPPORT FOR X-RAY APPARATUS

Andre Massiot, Saint-Cloud, France, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of application Ser. No. 774,546, Nov. 8, 1968, now abandoned, Continuation of application Ser. No. 493,429, Oct. 6, 1965, now abandoned. This application Jan. 12, 1970, Ser. No. 1,962
Int. Cl. H01j 5/48, 39/12
U.S. Cl. 250—92 **7 Claims**



A stand for an X-ray apparatus includes a column, an arm vertically movable on the column, and a carriage supported by the arm. The carriage carries an X-ray tube and a detector and is rotatable about a horizontal axis and about an intersecting vertical axis. Also, the X-ray detector is movable toward the X-ray tube along a third axis which intersects the other axes and is perpendicular with the vertical axes.

3,617,750

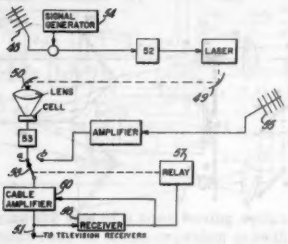
LASER LINK COMMUNICATION SYSTEM

Harold R. Walker, Metuchen, N.J., assignor to Laser Link Corporation, New York, N.Y.

Continuation-in-part of application Ser. No. 585,647, Oct. 10, 1966, now abandoned. This application Feb. 9, 1970, Ser. No. 9,113

Int. Cl. H04b 9/00

U.S. Cl. 250—199 2 Claims



A laser modulator and its application to a communication system and in particular to a television signal distribution system employing modulated laser beams is disclosed.

3,617,751

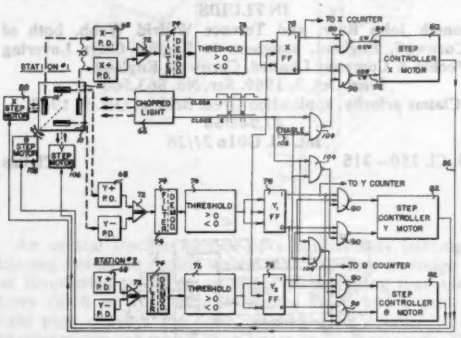
METHOD AND APPARATUS FOR ARTICLE POSITIONING UTILIZING AN INCREMENTAL ARTICLE DRIVE SYSTEM AND NULL TRANSIT COUNTER

Kenneth Levy, Framingham; James M. Mulvaney, Southboro, and David Friedman, Framingham, all of Mass., assignors to Computervision Corporation, Waltham, Mass.

Filed Aug. 18, 1969, Ser. No. 850,976

Int. Cl. G01j 1/20; G05b 1/00

U.S. Cl. 250—201 10 Claims



A system for positioning an article in a preselected translational and rotary orientation with respect to two coordinate axes. The system produces X, Y and θ electrical signals each having a parameter which changes between a first state and a second state depending upon the direction of displacement of the article from the preselected orientation. Three article positioners incrementally move the article in the X, Y and θ directions in response to the respective X Y and θ electrical signals. Three corresponding counters count the changes in state of the x, y and θ electrical signals. When the counts in the X, Y and θ counters reach preselected counts, the three article positioners are inhibited. At this point, the article is positioned within one X, Y and θ movement increment of the preselected orientation.

3,617,752

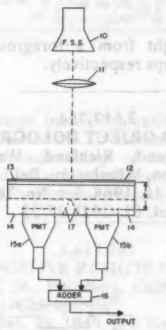
LIGHT COLLECTION AND DETECTION APPARATUS COMPRISING PLURAL LIGHT SENSORS SO SPACED THAT THE COMPOSITE RESPONSE IS INDEPENDENT OF SOURCE POSITION

Charles E. Page, Westbury, and Gustavo A. Andersen, Hollis, both of N.Y., assignors to Hazeltine Corporation

Filed Nov. 6, 1969, Ser. No. 874,548

Int. Cl. H01j 39/12

U.S. Cl. 250—209 20 Claims



Disclosed is light collection and detection apparatus which exhibits a substantially uniform response characteristic with respect to a diffuse spot of light which may emanate from any point on a planar source such as exists where a flying spot scanner scans a photographic transparency that is positioned on a translucent, opal glass plate. Located below the glass plate and separated therefrom by a chosen distance is a plurality of photomultipliers, each having a known polar light response characteristic which is nonuniform with respect to at least some of the possible points from which the diffuse spot of light may emanate on the opal surface of the glass plate. Each of the photomultipliers develops an output signal representative of the intensity of the diffuse spot, and the plurality of photomultipliers are arranged in a predetermined array in a plane substantially parallel to that of the glass plate so as to effect an overlapping of the light response characteristics of the individual photomultipliers by a selected amount in the plane of the opal glass plate. The output signals from the individual photomultipliers are additively combined to develop a resultant output signal whose amplitude is substantially linearly proportional to the intensity of the diffuse spot of light regardless of the location of the point on the opal glass plate from which the spot of light emanates. Other embodiments are disclosed.

3,617,753

SEMICONDUCTOR PHOTOELECTRIC CONVERTING DEVICE

Taketoshi Kato, Yokohama-shi; Shigeharu Horiuchi, Yokohama-shi, and Shigeo Tsuji, Fujisawa-shi, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki-shi, Japan

Filed Jan. 12, 1970, Ser. No. 2,171

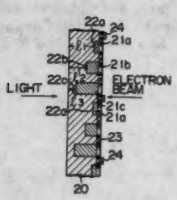
Claims priority, application Japan, Jan. 13, 1969, Mar. 3, 1969; 44/2788, 44/15406

Int. Cl. H01j 39/12

U.S. Cl. 250—211 J 10 Claims

A semiconductor photoelectric converting device comprising a semiconductor substrate having a plurality of PN-junc-

tions separately formed therein in three groups according to their different depths so as to allow the red, green and blue



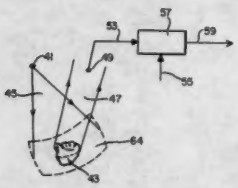
components of a light from a foreground object to be separated by said groups respectively.

3,617,754

SCANNED OBJECT HOLOGRAPHY

Bernard P. Hildebrand, Richland, Wash., assignor to Holotron Corporation, Wilmington, Del.

Filed Dec. 10, 1968, Ser. No. 782,582
Int. Cl. G02b *27/22*
U.S. Cl. 250—216 **9 Claims**



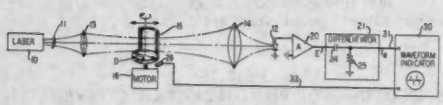
A technique for constructing a hologram by scanning an object relative to a fixed source and receiver. The object motion is restricted either relative to the source radiation or relative to the receiver in a manner to allow construction of an ordinary hologram from which the usual type of images may be reconstructed.

3,617,755

APPARATUS FOR LOCATING AND MEASURING THE BEAM-WAIST RADIUS OF A GAUSSIAN LASER BEAM

Jacques A. Arnaud, Colts Neck, N.J., assignor to Bell Telephone Laboratories Incorporated, Murray Hill, N.J.

Filed Dec. 10, 1969, Ser. No. 883,695
Int. Cl. G02f *1/28*
U.S. Cl. 250—217 **8 Claims**



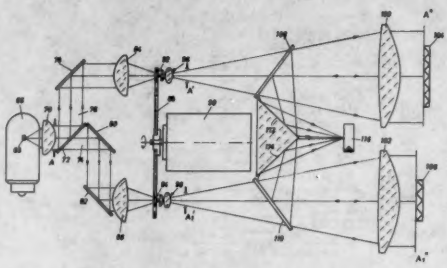
The beam-waist and beam-waist radius of a Gaussian laser beam are electronically located and measured by selectively interrupting the laser beam at two or more parallel planes separated by a preestablished fixed distance. Pulsive signals representative of the light intensity at each of the planes of interruption are differentiated to obtain signals representative of the beam radius at the planes of interruption. A ratio of the peak amplitudes of the signals representative of the beam radii is obtained and utilized as a measure of the beam-waist radius.

3,617,756

OPTICAL MEASURING APPARATUS USING MEASURING AND COMPARISON LIGHT BEAMS

Erwin Sick, Stifterweg 6, Icking (Isartal), Germany

Filed Mar. 24, 1969, Ser. No. 809,598
Claims priority, application Germany, Mar. 26, 1968, P 17 72 064.8
Int. Cl. G01n *21/12*
U.S. Cl. 250—218 **7 Claims**



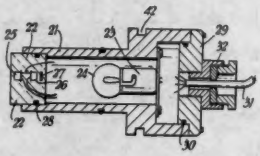
An optical measuring apparatus has optical elements which define two light paths from the filament of a light source to a photoelectric cell. Both of these paths traverse a rotating chopping disc. The beam along one path forms a comparison beam and the beam along the other path serves as a measuring beam. The optical elements of the measuring beam include a reflector so that the measuring beam has a portion of its path coincident in front of the reflector. An aperture diaphragm is positioned across a portion of the path of the measuring beam and the optical elements of the measuring beam are such as to image the aperture diaphragm in the plane of the reflector and in a size larger than the size of the reflector.

3,617,757

MEASUREMENT OF THE CONCENTRATION OF SOLIDS IN FLUIDS

Kenneth John Burr, and Terence Wilfrid Webb, both of Cornwall, England, assignors to English Clays Lovering Pochin & Company Limited, Cornwall, England

Filed Oct. 3, 1969, Ser. No. 863,560
Claims priority, application Great Britain, Oct. 9, 1968, 47,946/68
Int. Cl. G01n *21/26*
U.S. Cl. 250—218 **8 Claims**



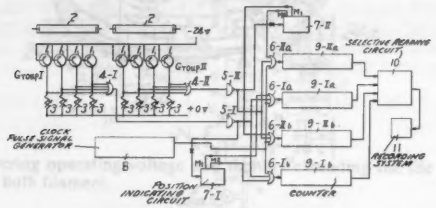
An apparatus for determining the concentration of solids in suspension in a fluid. The apparatus comprises a source of light, a measurement chamber to contain a quantity of the suspension and to admit thereinto only a single beam of light from said source of light, a first photocell to receive light originating from said source of light and reflected through an angle of approximately 180° by solid particles in the suspension and to produce a signal proportional to the intensity of the reflected light, a second photocell to receive light directly thereon from said source of light and to produce a signal proportional to the intensity of the light, and means for comparing the signals produced by the first and second photocells as a function of the solids concentration of the suspension in the measurement chamber.

3,617,758

METHOD AND APPARATUS FOR MEASURING SIZE OF ZONE HAVING OPTICAL STAINS

Kazuo Nagamatsu, Amagasaki-shi, Japan, assignor to Takeda Chemical Industries, Ltd., Osaka-shi, Japan

Filed Dec. 22, 1969, Ser. No. 887,298
Claims priority, application Japan, Dec. 30, 1968, 44/800
Int. Cl. G01b 7/12
U.S. Cl. 250—222 15 Claims



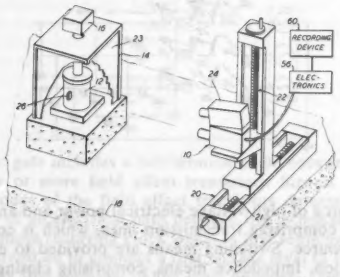
In measuring the size of a zone having optical stains, such as an inhibition zone of micro-organism growth, the method of the invention is characterized by scanning said zone by plural photoconductive detectors disposed in a row at a constant speed, the scanning direction being at a right angle to the row of said detectors, and measuring the size of said zone by electrically measuring the time during which at least one of said detectors is in operation.

3,617,759

ELECTROOPTICAL MEASURING SYSTEM

Kelsey Martin, Azle, Tex., assignor to Martin Tracker Corporation, College Station, Tex.

Filed Apr. 3, 1968, Ser. No. 718,444
Int. Cl. H01j 3/14, 5/16, 39/12
U.S. Cl. 250—234 20 Claims



An optical tracker formed of a substantially light-tight housing having an optical system which focuses an image of an illuminated target on an image plane having four apertures which are symmetrically spaced on X- and Y-axes. A light pipe conveys the light entering each aperture to a photosensitive cell which has a linear and fast response. The cell provides an electrical signal proportional to the light received. The signals from a pair of cells are transmitted to a difference circuit for obtaining an electrical quantity proportional to the difference between the currents from the pair of cells. An amplifier provides a higher amplitude signal.

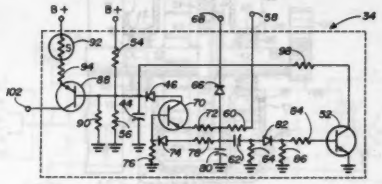
3,617,760

PULSE-WIDTH DETECTOR

James J. Jones, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed June 30, 1969, Ser. No. 837,418
Int. Cl. H03k 4/08
U.S. Cl. 307—234 14 Claims

A vehicle skid-control braking system of the type that includes circuit means for generating a signal varying in accordance with braking conditions, such as vehicle speed, wheel speed and road surface conditions. The system includes a pulse-width detector that receives a source of signals that vary from a first value to a second value and includes circuit means for storing a charge when the signal is at a first value with the charge increasing until the signal reaches a second value, and reset circuit means responsive to a reset signal generated at each change of the signal from the first value to the second value for discharging the stored charge at the beginning of each subsequent charge cycle.

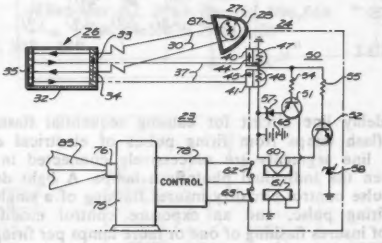


3,617,761

RADIATION SENSITIVE REMOTE CONTROL SYSTEM

Dexter P. Cooper, Jr., Pasadena, Calif., assignor to Bell & Howell Company, Chicago, Ill.

Filed Dec. 15, 1969, Ser. No. 885,010
Int. Cl. G02f 1/18
U.S. Cl. 250—225 20 Claims



A remote control system has a control for effecting a first control function in response to sensed incident light which has a first quality of polarization, and a second control function in response to sensed incident light which has a second quality of polarization. A projecting arrangement directs a beam of light away from polarized light-sensing means connected to the control, and a portable remote unit includes a reflector for directing the light beam to the sensing means, and light polarizers for selectively imparting on the light beam the mentioned first quality of polarization and alternatively the mentioned second quality of polarization.

3,617,762

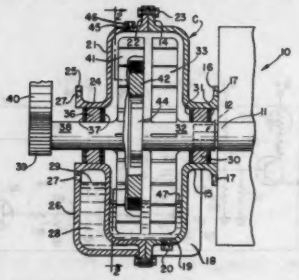
STARTER MOTOR GENERATOR COUPLING

Kevin L. Price, 22516 Wanamaker Pl., Detroit, Mich., and James C. Le Blanc, 39384 West Archer, Mt. Clemens, Mich.

Filed Aug. 25, 1970, Ser. No. 66,733
Int. Cl. H02k 23/52
U.S. Cl. 290—46 8 Claims

A starter motor having an armature shaft that is connected to the flywheel of an internal combustion engine by mechani-

cal driving connections to drive the flywheel from the motor. However, when the motor is to be driven from the engine this mechanical drive is disabled and a fluid coupling is rendered effective to convert the motor to a generator.

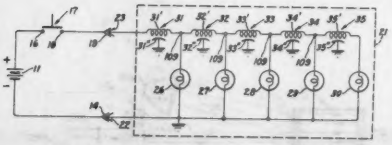


3,617,763

DELAY LINE CIRCUIT FOR SEQUENTIALLY FLASHING PHOTOFLASH LAMPS

Edward L. Laskowski, Parma, Ohio, assignor to General Electric Company

Filed Aug. 28, 1970, Ser. No. 67,889
Int. Cl. H02j 3/14
U.S. Cl. 307—41 **11 Claims**



A delay line circuit for causing sequential flashing of photoflash lamps from firing pulses of electrical energy. Delay line segments are successively connected in series between the individual photoflash lamps. A light detector and pulse control circuitry insures flashing of a single lamp per firing pulse, and an exposure control modification thereof insures flashing of one or more lamps per firing pulse as needed for correct exposure.

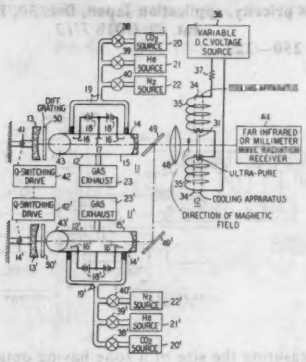
3,617,764

FAR INFRARED WAVE GENERATOR OR MIXER

Chandra K. Patel, Summit, and Nguyen Van Tran, Matawan Township, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Continuation-in-part of application Ser. No. 690,307, Dec. 13, 1967, now Patent No. 3,461,403, dated Aug., 1969. This application May 6, 1969, Ser. No. 822,241
Int. Cl. H03f 7/04
U.S. Cl. 307—88.3 **6 Claims**

A phase-matched tunable millimeter wave or far infrared wave generator or mixer employs semiconductor active media having large bound-electron second-order nonlinear effects but which, in particular instances, are not sufficiently birefringent to be phase-matchable by conventional techniques. There is generated a linearly polarized difference-frequency wave for which free carriers (electrons or holes) have the effect of subtracting an appreciable amount from the index of refraction determining its propagation constant. The linearly polarized wave is generated in crystals of the active medium when the frequencies of a pair of input radiations to be mixed and a tuning condition, such as the magnitude of magnetic field applied transversely to the direction of propagation of the input radiations, are appropriately selected. Also, in a parametric oscillator, one radiation is supplied and a second radiation relatively closely spaced in frequency is highly resonated, the frequency of the second radiation and the difference frequency being variable by variation of the magnetic field magnitude.

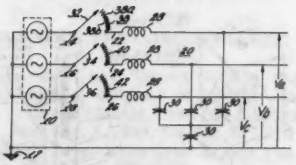


3,617,765

VARIABLE CLOSING RESISTOR

Alfred E. Kilgour, Brookfield, and James H. Harlow, Hales Corners, both of Wis., assignors to Allis-Chalmers Manufacturing Company, Milwaukee, Wis.

Filed Apr. 16, 1968, Ser. No. 721,666
Int. Cl. H02h 3/22
U.S. Cl. 307—93 **9 Claims**



A source of high-voltage electrical power and an electrical system, comprising transmission lines, which is connectable to the source. Switching means are provided to effect such connection. Impedance means, comprising closing resistors, are provided for insertion in series between the source and system upon closing of the switching means to reduce voltage surges in the system. Each closing resistor has a variable resistance value, i.e., a predetermined initial value when first inserted which is decreased at a predetermined rate within a predetermined time after insertion to effect improved reduction of voltage surges.

3,617,766

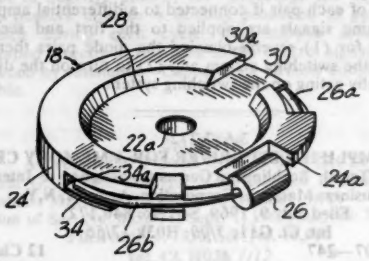
RECTIFIER FOR EXTENDING THE LIFE OF LIGHT BULBS

Robert D. Kahn, Rockville Centre, N.Y., assignor to Fedtro, Inc., Rockville Centre, N.Y.

Filed Sept. 25, 1969, Ser. No. 861,003
Int. Cl. H05b 41/392
U.S. Cl. 307—146 **1 Claim**

A lighting accessory device is described for rectifying the alternating current voltage input to a conventional light bulb. The device includes an insulator separator plate having a diode inserted to its periphery, the diode being connected to contact plates above and below the insulator separator plate.

A plastic, annular housing is used for the device to provide an economical, safe and convenient accessory device for



lowering operating voltage and thereby extending the life of the bulb filament.

3,617,767

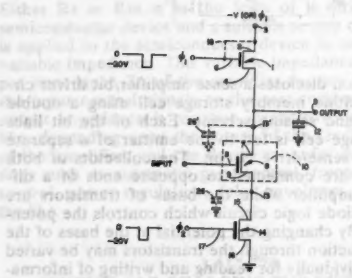
FIELD EFFECT TRANSISTOR LOGIC GATE WITH ISOLATION DEVICE FOR REDUCING POWER DISSIPATION

Robert Kenneth Booher, Mission Viejo, Calif., assignor to North American Rockwell Corporation

Continuation of application Ser. No. 523,767, Jan. 28, 1966, now Patent No. 3,526,783, dated Sept. 1, 1970. This application Feb. 11, 1970, Ser. No. 10,966

Int. Cl. H03k *19/08*; **G11c** *19/00*

U.S. Cl. 307—205 **8 Claims**



The logic gate includes a two-terminal logic network comprising one or more field effect transistors. Signals on the gate electrodes of the field effect transistors determine the impedance of an electrical path between the terminals. During a first phase recurring clock signal, a first semiconductor switch is turned on to connect a first voltage level to the output and to a first terminal of the logic network. During the first phase recurring clock signal, the second terminal of the logic network is isolated from a second voltage level by an isolation field effect transistor connected between the second terminal and the second voltage level. During a second phase recurring clock signal, the isolation field effect transistor is turned on to permit the output to be connected to the second voltage level through the logical network if a relatively low-impedance path exists during the second phase recurring clock signal.

3,617,768

CHARGE TRANSFER DIODE SHIFT REGISTER

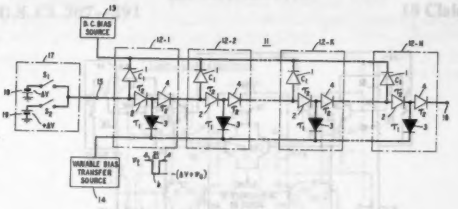
Sigurd Gunther Waaben, Princeton, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sept. 3, 1970, Ser. No. 69,227

Int. Cl. G11c *19/00*

U.S. Cl. 307—221 **13 Claims**

This application describes a shift register which employs a plurality of diode storage stages. Each of the diode stages includes: a first reverse-biased diode which is used as a capacitance for information storage; a second diode, of the charge-storage type, which is used for temporary information storage and for information transfer; and third and fourth diodes, of the Schottky barrier type, which are used for stage isolation and for directionality. Information, in the form of stored charge, is transferred from a first stage of the register to the next adjacent stage by applying a forward bias to the charge-storage diode of the former. Application of the bias



enables the charge stored in the capacitance of the first diode of the first stage to flow through the third diode of that stage and into the charge-storage diode, where it is temporarily stored. Reversal of the bias causes the stored charge to be discharged from the charge-storage diode, and to flow through the fourth diode into the capacitance of the first diode of the next adjacent stage, where it is again stored.

3,617,769

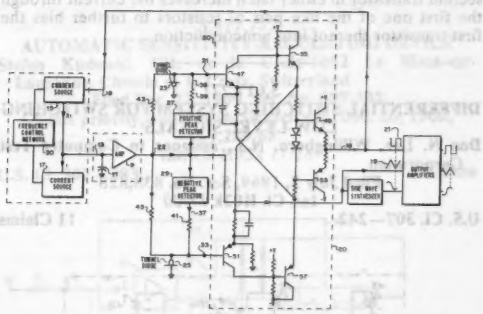
WAVE GENERATOR HAVING FREQUENCY-DEPENDENT TRIGGER LEVEL FOR CORRECTION OF LOOP DELAY

Raymond C. Hanson, Loveland, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Mar. 12, 1969, Ser. No. 806,568

Int. Cl. H03k *5/00*, *4/06*

U.S. Cl. 307—229 **2 Claims**



A wave generator includes an integrator with adjustable upper and lower limit detectors coupled to the output of the integrator for periodically reversing the current applied to the integrator to produce a repetitive triangle wave. The upper and lower levels of the triangle wave at which the detectors are actuated are altered as the operating frequency of the circuit increases.

ERRATUM

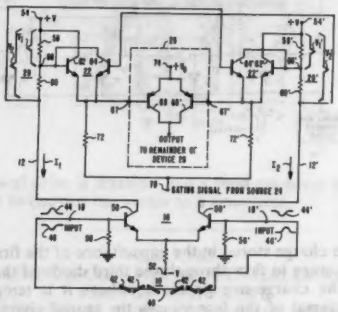
For Class 307—234 see:
Patent No. 3,617,760

3,617,770

SENSING CIRCUIT HAVING REGENERATIVE LATCHING CIRCUITS RESPONSIVE TO THRESHOLD DIFFERENCES IN BIASING VOLTAGES DERIVED FROM A PAIR OF DIFFERENTIALLY VARIABLE CURRENTS

David E. Norton, Boulder, Colo., and Joseph A. Lake, Jr., Lincoln Park, N.J., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 10, 1969, Ser. No. 790,247
Int. Cl. H03k 5/20, 3/286
U.S. Cl. 307—235 6 Claims



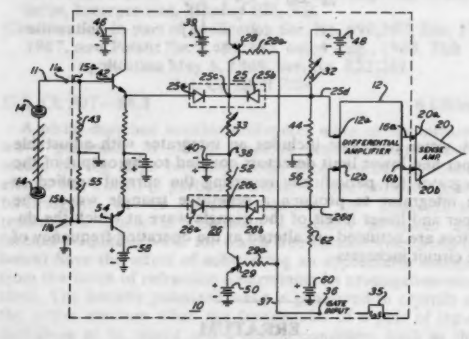
A sensing circuit in which currents in two different paths are differentially varied in response to bipolar input signals. A differential change in the currents sufficient to render the voltage drop across a pair of resistors in either current path approximately equal to the drop across the first one of a like pair of resistors in the other path results in the conduction of the second transistor in an appropriate one of a complementary pair of two-transistor latches to provide an output indication that an input signal at least equal to a predetermined minimum value has been sensed. The voltage drop across the second resistor of each pair establishes an operational threshold which is relatively insensitive to common circuit variations such as in the total current through the two paths, and the latches are regenerative in that conduction by the second transistor in either latch increases the current through the first one of the like pair of resistors to further bias the first transistor thereof into nonconduction.

3,617,771

DIFFERENTIAL SWITCHING SYSTEM FOR SWITCHING LOW-LEVEL SIGNALS

Don N. Lee, Willingboro, N.J., assignor to Computer Test Corporation

Filed July 3, 1969, Ser. No. 838,828
Int. Cl. H03k 17/00
U.S. Cl. 307—242 11 Claims



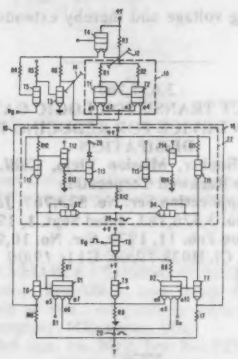
A differential switching system for switching low-level signals in the presence of high-level unwanted signals having a first and a second pair of diodes in which for each pair similar-type electrodes are connected together to form a first and a second junction. A first and a second transistor are respectively connected to the first and second junction and one diode of each pair if connected to a differential amplifier. Switching signals are applied to the first and second transistors for (1) reverse-biassing the diode pairs thereby gating off the switching system and (2) to turn on the diode pairs thereby gating on the switching system.

3,617,772

SENSE AMPLIFIER/BIT DRIVER FOR A MEMORY CELL

Klaus G. Tertel, Boeblingen, Germany, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed July 9, 1969, Ser. No. 840,172
Int. Cl. G11c 7/00; H03k 17/56
U.S. Cl. 307—247 12 Claims



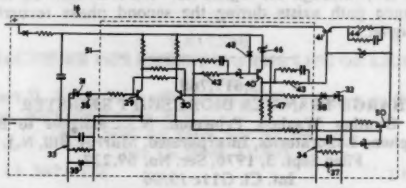
This specification discloses a sense amplifier/bit driver circuit for a monolithic memory storage cell using a double ended bit drive and sensing scheme. Each of the bit lines serving this storage cell is fed to the emitter of a separate transistor of the sense/drive circuit. The collectors of both these transistors are connected to opposite ends of a differential sense amplifier while the bases of transistors are connected to a diode logic circuit which controls the potential at the base. By changing the potential at the bases of the transistors, conduction through the transistors may be varied in concert or individually for reading and writing of information in the storage cells and for turning the transistors off while the storage cell is not being addressed.

3,617,773

THYRISTOR GATING CIRCUITS

Arnaud Michael Eccles, Stafford, England, assignor to The English Electric Company Limited, London, England

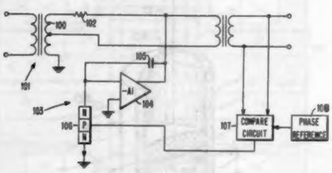
Filed Jan. 27, 1969, Ser. No. 794,146
Claims priority, application Great Britain, Jan. 25, 1968; Jan. 25, 1968; 3976/68, 3977/68
Int. Cl. H03k 17/72, 17/06
U.S. Cl. 307—252 C 7 Claims



A thyristor gating circuit embodying a bistable circuit and a constant current stage, the bistable being activated by light-responsive control signals so as selectively to provide through

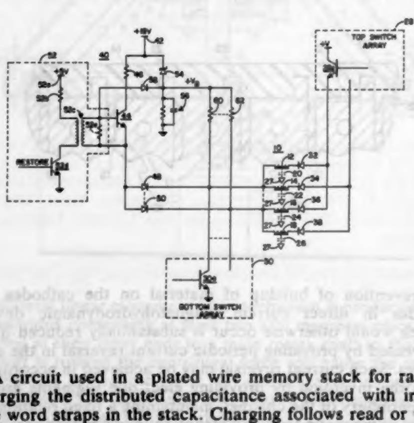
this stage a constant current output of positive polarity for maintaining the thyristor conductive, and a constant current output of negative polarity for "blocking" the thyristor. A sharp positive impulse is initially produced to gate-on the thyristor during each cycle, this impulse either being developed directly in response to the control signal or being produced by resistance—Capacitance circuits coupled to the bistable.

3,617,774
AUTOMATIC PHASE CONTROL CIRCUIT
William G. Crouse, Raleigh, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.
Division of Ser. No. 665,074, Sept. 1, 1967, Pat. No. 3,539,826.
Filed Mar. 4, 1970, Ser. No. 16,504
Int. Cl. H03k *1/12*
U.S. Cl. 307—262 **3 Claims**



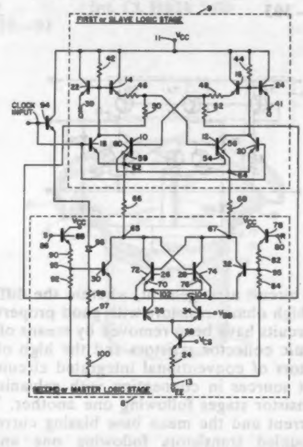
An inverting amplifier includes a shunt feedback impedance element connected between its input and output terminals. The feedback current is divided between a series input resistance Rin and an impedance Rs shunting Rin. Either Rs or Rin is in the form of a variable impedance semiconductor device and a suitable source of control signals is applied to the semiconductor device to cause it to have a variable impedance. This variable impedance causes the output impedance Zo of the amplifier to vary as a function of the input control signals to the semiconductor device. The output impedance is resistive, capacitive, inductive, or the like, depending upon the nature of the feedback impedance of the amplifier; and the device is useful in varied applications such as automatic gain control, frequency and phase control, power regulation, delay equalizers, modulators and the like.

3,617,775
CIRCUIT FOR CHARGING THE DISTRIBUTED CAPACITANCE OF A PLATED WIRE MEMORY
James D. Allen, Pinellas, Fla.
Filed June 3, 1970, Ser. No. 42,948
Int. Cl. H03k *3/21, 3/51*
U.S. Cl. 307—270 **5 Claims**



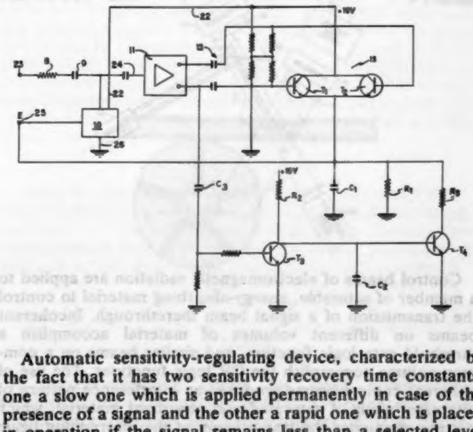
A circuit used in a plated wire memory stack for rapidly charging the distributed capacitance associated with inductive word straps in the stack. Charging follows read or write cycles and effectively reverse-biases diodes in series with the previously selected straps in preparation for a new cycle, thus preventing the inductive kick of a newly selected strap from energizing nonselected straps.

3,617,776
MASTER SLAVE FLIP-FLOP
Ury Priel, Cupertino, Calif., assignor to Motorola, Inc., Franklin Park, Ill.
Filed Mar. 13, 1969, Ser. No. 806,981
Int. Cl. H03k *3/12*
U.S. Cl. 307—291 **18 Claims**



Disclosed is a master slave flip-flop including two bistable logic stages, each of which includes transistors which are cross-connected to alternately conduct as binary information is applied to the stages. Both logic stages are connected to receive clock signals which enable binary information to be applied to and stored by one of the two logic stages and thereafter shifted into the other stage when the level of clock signals changes.

3,617,777
AUTOMATIC SENSITIVITY-REGULATING DEVICE
Stefan Kudelski, CH. de la Croix-1052 Le Mont-sur-Lausanne, Chemin de la Croix, Switzerland
Filed Dec. 22, 1969, Ser. No. 887,302
Claims priority, application Switzerland, Dec. 26, 1968, 19,289/68
Int. Cl. H03k *17/28*
U.S. Cl. 307—293 **6 Claims**



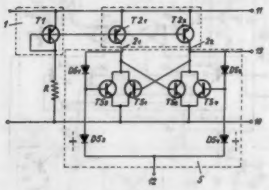
Automatic sensitivity-regulating device, characterized by the fact that it has two sensitivity recovery time constants, one a slow one which is applied permanently in case of the presence of a signal and the other a rapid one which is placed in operation if the signal remains less than a selected level during a selected period of time.

3,617,778

ELECTRONIC CIRCUIT ARRANGEMENT WITH AT LEAST ONE INTEGRATED ELECTRONIC CIRCUIT UTILIZING CONSTANT CURRENT SOURCES IN CONNECTION WITH GALVANIC COUPLING BETWEEN TRANSISTOR STAGES COUPLED WITH EACH OTHER IN LIEU OF HIGH OHMIC RESISTORS

Arpad Korom, Zurich, Switzerland, assignor to Gesellschaft Zur Forderung Der Forschung An Der Eidg Techn Hochschule, Zurich, Switzerland

Filed June 11, 1969, Ser. No. 832,287
Claims priority, application Switzerland, July 6, 1968, 10174
Int. Cl. H03k 23/08
U.S. Cl. 307—303 32 Claims



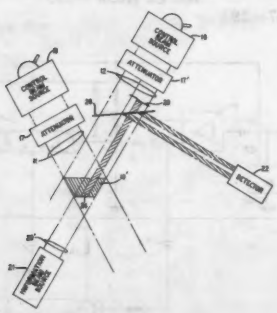
Integrated circuit arrangement, wherein the difficulties of building up high ohmic resistors with good properties within integrated circuits have been removed by means of replacing the high ohmic collector resistors and the high ohmic base biasing resistors of conventional integrated circuits by constant current sources in connection with galvanic coupling between transistor stages following one another. The mean collector current and the mean base biasing current of galvanically coupled transistors following one another are delivered by one constant current source. The alternating collector current superposed to this means collector current flows directly and completely into the base-emitter circuit of the galvanic coupled following transistor.

3,617,779

ELECTROMAGNETIC ENERGY LOGIC EMPLOYING SATURABLE ABSORBERS

Robert Rosenberg, FairHaven, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 10, 1968, Ser. No. 743,860
Int. Cl. H03k 19/32
U.S. Cl. 307—312 23 Claims



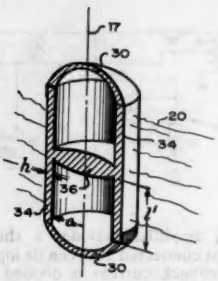
Control beams of electromagnetic radiation are applied to a member of saturable, energy-absorbing material to control the transmission of a signal beam therethrough. Incoherent beams on different volumes of material accomplish a threshold gate logic function, and similar beams on a common volume accomplish the OR logic functions. The use of coherent control beams produces an interference pattern of alternate bands of saturated and absorbent material, which pattern attenuates the transmission of the information beam through the material even though each control beam is of sufficient intensity, when acting alone, to saturate the material so that it is essentially transparent to the signal beam. Information signal transmission occurs as an EXCLUSIVE OR logic function of the coherent control beams, and such function is extendable for generating a logical NEGATION function and for complementing the information in a photographic transparency.

3,617,780

PIEZOELECTRIC TRANSDUCER AND METHOD FOR MOUNTING SAME

Albert Benjaminson, Menlo Park, and Donald L. Hammond, Los Altos Hills, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Oct. 26, 1967, Ser. No. 678,306
Int. Cl. H01v 7/00
U.S. Cl. 310—8.2 6 Claims



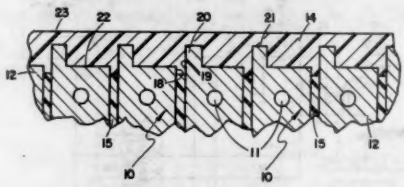
Piezoelectric transducer apparatus which includes a resonator section peripherally supported by a hollow cylindrical housing section formed as an integral part of the resonator section. Electrodes are disposed about the resonator section to produce a vibration-exciting electric field in response to a signal appearing on the electrodes.

3,617,781

METHOD OF PREVENTING MATERIAL BUILDUP IN ELECTRODES IN MHD DEVICES

Richard J. Rosa, Reading, Mass., assignor to Avco Corporation, Cincinnati, Ohio

Filed July 24, 1969, Ser. No. 844,582
Int. Cl. H02m 4/02
U.S. Cl. 310—11 2 Claims



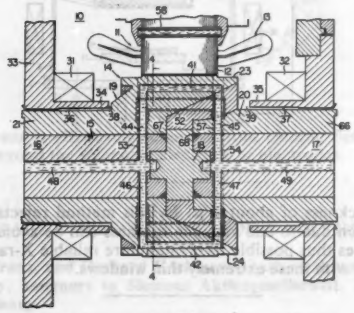
Prevention of buildup of material on the cathodes and anodes in direct current magnetohydrodynamic devices which would otherwise occur is substantially reduced if not prevented by providing periodic current reversal in the electrodes. Such current reversal may be achieved in accordance with the invention by providing electrode segments around the periphery of the channel, maintaining a fixed relationship between magnetic field and means coupling appropriate electrode segments to the load and rotating the channel.

3,617,782

SYNCHRONOUS MACHINE PROVIDED WITH LIQUID-COOLED COMB-SHAPED ROTOR

Hideteru Nakamura; Moriyoshi Sakamoto, and Hiroyuki Kitamura, all of Yokohama-shi, Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha (also known as Tokyo Shibaura Electric Co., Ltd.), Kanagawa-ken, Japan

Filed Jan. 16, 1970, Ser. No. 3,462
Claims priority, application Japan, Jan. 20, 1969, Jan. 20, 1969; 44/3405, 44/3406
Int. Cl. H02k 9/00, 1/22
U.S. Cl. 310—61 3 Claims



A synchronous machine provided with a comb-shaped pole-type rotor which includes ducts in the rotor for passage of cooling liquid therethrough. There are provided wedge members of nonmagnetic material, each of which is welded at the side edges thereof to sidewalls of the adjacent pole pieces of the rotor whereby an airgap of the machine is prevented from leaking the cooling liquid thereinto

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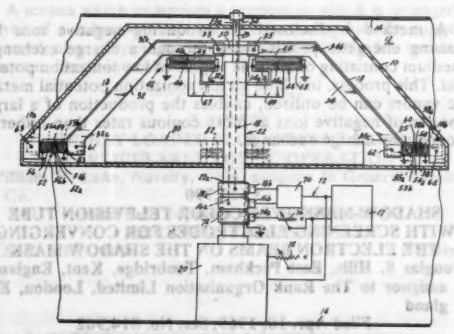
3,617,783

CENTRIFUGAL ELECTROMAGNETIC PROPULSION MACHINE

Thomas Joseph Sutter, Jr., 8417 South Wayne Ave., Chicago, Ill.

Filed Mar. 24, 1970, Ser. No. 22,240
Int. Cl. H02k 7/00
U.S. Cl. 310—67 9 Claims



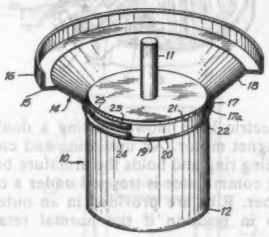
Unilateral linear movement of a mechanism is produced by an apparatus comprising at least two arm members pivotally attached at their inner ends to a main rotary shaft so that as the shaft is rotated the centrifugal force will cause the arms to produce a gyroscopic effect. An electromagnet means attached to the main shaft below the point of attachment of the arms and positioned in fixed relationship to each of the arms attracts a magnet means on each of the arms spaced therefrom by a generally fixed gap during the rotary movement of the arm members whereby when the arms are under the influence of centrifugal force caused by rotary motion the main rotary shaft is raised upwardly to cause unidirectional movement of the mechanism.

3,617,784

STRUCTURE FOR MOUNTING ELECTRIC MOTORS

Nils Kauri Lindgren, Stockholm, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden

Filed Dec. 9, 1970, Ser. No. 96,472
Claims priority, application Sweden, Dec. 12, 1969, 17168/69
Int. Cl. H02k 5/00
U.S. Cl. 310—91 6 Claims



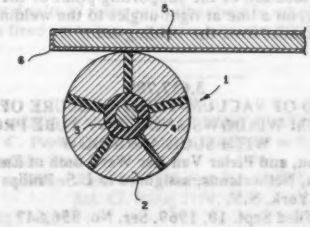
An electric motor having a stationary part formed with an annular groove is mounted on a member at an aperture therein. The member at the aperture has an inner edge which includes an inward extending portion between a pair of elastomeric O-rings disposed in the bottom of the groove. The inner edge of the apertured member functions to hold the O-rings in frictional engagement with the motor part. Each of the O-rings in such frictional engagement with the motor part presses against the other with each of the O-rings bearing against a different one of the axially spaced shoulders of the groove in sealing engagement therewith.

3,617,785

CURRENT-COLLECTING DEVICE FOR SMALL COMMUTATING MACHINES

Henry Kristiansen, Sarnen, Switzerland, assignor to Interelectric Sachseln A.G., Switzerland

Filed July 24, 1970, Ser. No. 57,964
Int. Cl. H01r 39/20
U.S. Cl. 310—236 9 Claims

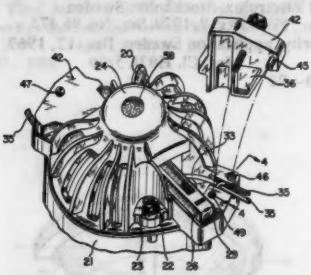


A current-collecting device for small commutating machines having a commutator of 85 to 95 percent silver and 15 to 5 percent copper; and having brushes of 50 to 70 percent silver, 25 to 40 percent palladium, and 3 to 10 percent copper.

3,617,786
ELECTRIC MOTOR COMMUTATOR END CONSTRUCTION

Henry J. Stielper, Baltimore, Md., assignor to The Black and Decker Manufacturing Company, Towson, Md.

Filed May 13, 1970, Ser. No. 36,860
Int. Cl. H01r 39/38
U.S. Cl. 310—242 7 Claims

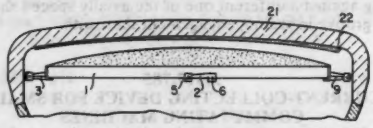


A rotary electric lawn mower having a double insulated permanent magnet motor. An insulating end cap is fitted to the field retaining ring and holds the armature bearing. Brush rigging for the commutator is trapped under a cap affixed to the end member. Ribs are provided in an outer housing to keep the cap in position if the normal retaining means becomes loose.

3,617,787
BIMETALLIC SPRING SUPPORT FOR A SHADOW MASK

Gerardus Wilhelmus Plukker, Emmasingel, Eindhoven, Netherlands

Filed June 19, 1969, Ser. No. 834,684
Claims priority, application Netherlands, June 21, 1968, 6808720
Int. Cl. H01j 29/46, 31/20
U.S. Cl. 313—85 3 Claims



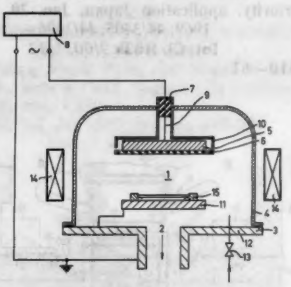
In order to check displacement of a shadow mask in a plane at right-angles to the axis of a cathode-ray tube, it is suspended from three flat springs consisting of two strips which are welded together along their narrow sides and constitute a bimetal; the coefficient of expansion of said springs is adapted to the location of the springs on the shadow mask edge by the location of the supporting point of the spring to the envelope, on a line at right-angles to the welding seam at different distances from the welding seam.

3,617,788
METHOD OF VACUUM-TIGHT CLOSURE OF THIN BERYLLIUM WINDOWS AND X-RAY TUBE PROVIDED WITH SUCH A WINDOW

Jan Goorissen, and Pieter Van Der Werf, both of Emmasingel, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 10, 1969, Ser. No. 856,647
Claims priority, application Netherlands, Sept. 14, 1968, 6813190
Int. Cl. H01j 35/18
U.S. Cl. 313—59 5 Claims

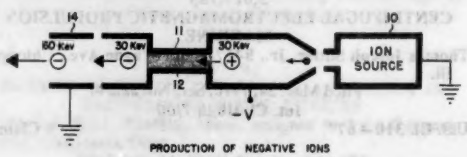
The invention provides a method of vacuum-tight closure of beryllium windows of X-ray tubes and especially thin windows for use in X-ray fluorescence analysis of elements of a low atomic number, said windows having a thickness of only about 50 μ. The window material or the ready windows are for this purpose provided by a known method of sputtering material particles with an extremely thin layer of beryllium or beryllium oxide. The practically unavoidable pores or cracks in the beryllium foil are found to be completely closed by a layer thickness of about 1 μ. By this method rejects in the production due to bad vacuum-tightness can be avoided and it becomes thus possible to manufacture reliable X-ray tubes provided with these extremely thin windows.



3,617,789
PROCESS FOR PRODUCTION OF NEGATIVE HELIUM IONS AND OTHER NEGATIVE IONS

Roy Middleton, Moylan, and Charles T. Adams, Wallingford, both of Pa., assignors to University of Pennsylvania, Philadelphia, Pa.

Filed Apr. 14, 1969, Ser. No. 815,551
Int. Cl. H05h 5/00
U.S. Cl. 313—63 6 Claims



PRODUCTION OF NEGATIVE IONS

A method is disclosed for producing negative ions by passing energetic positive ions through a charge exchange medium consisting of metallic vapors of low ionization potential. This process, in which all low ionization potential metallic vapors can be utilized, enables the production of a large species of negative ions at more copious rates than hitherto possible by charge exchange.

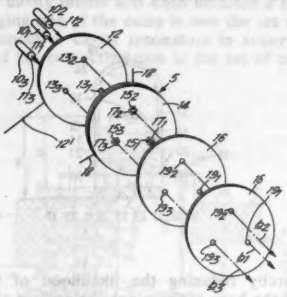
3,617,790
SHADOW-MASK TYPE COLOR TELEVISION TUBE WITH SCREENING ELECTRODES FOR CONVERGING THE ELECTRON BEAMS ON THE SHADOW MASK

Douglas S. Hills, East Peckham, Tonbridge, Kent, England, assignor to The Rank Organisation Limited, London, England

Filed Apr. 10, 1969, Ser. No. 814,962
Claims priority, application Great Britain, Apr. 10, 1968, 17,261/68
Int. Cl. H01j 29/06, 29/46, 29/56
U.S. Cl. 313—82 15 Claims

An electron gun assembly for use particularly in a shadow-mask color television cathode-ray tube has a plurality of (usually three) electron emissive areas adjacent which an accelerating electrode or electrodes is or are arranged for producing respective substantially collimated electron beams from electrons emitted by said areas. The collimated beams

pass through an apertured screening electrode or electrodes so arranged that the space extending up to the electron emis-

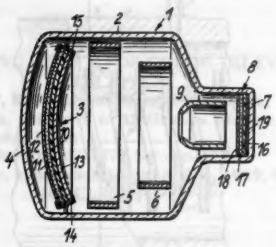


sive areas is effectively screened from electric fields in the tube beyond the screening electrode or electrodes.

3,617,791
IMAGE INTENSIFIER INCLUDING POLYIMIDE SUPPORT

Karl Franz, and Gerhard Kochmann, both of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Erlangen, Germany

Filed Mar. 11, 1969, Ser. No. 812,543
Claims priority, application Germany, Mar. 14, 1968, P 16 22 999.5
Int. Cl. H01j *39/00, 39/04, 31/50*
U.S. Cl. 313—94 **3 Claims**



A screen which comprises a support on which is arranged a layer of a substance capable of fluorescing has the support formed of a polyimide. The screen is suitable for use in a vacuum image intensifier.

3,617,792
HIGHLY LOADED FLOURESCENT LAMP PARTICULARLY FOR DC OPERATION

William H. Lake, Novelty, Ohio, assignor to General Electric Co.

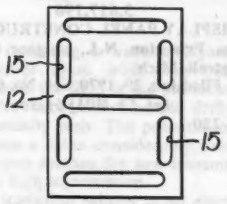
Filed Feb. 24, 1969, Ser. No. 801,612
Int. Cl. H01j *61/20, 61/44*
U.S. Cl. 313—109 **5 Claims**

A highly loaded fluorescent lamp in which the discharge is confined to an inner vitreous tube within a sealed outer envelope. The tube is open at the ends and internally phosphor coated. Lower temperature control of the mercury vapor is achieved, together with higher electrical efficiency, particularly when a noncircular inner tube, such as an oval or grooved tube, is used to decrease the diffusion length of the discharge. The inner tube may be thin-walled because the pressure is the same on both sides. In DC operation, cataphoretic pumping of mercury vapor from the anode towards the cathode is largely overcome by gas flow in the zone between inner tube and outer envelope.

3,617,793
ELECTRODE MOUNTING STRUCTURE FOR PROVIDING INSULATION

Tokuo Matsushita, and Satoshi Watanabe, both of Tokyo, Japan, assignors to Okaya Denki Sangyo Kabushikikaisha, Tokyo, Japan

Filed Oct. 2, 1969, Ser. No. 863,043
Claims priority, application Japan, Oct. 19, 1968, 43/73728
Int. Cl. H01j *1/90, 19/44*
U.S. Cl. 313—109.5 **3 Claims**



An indicator discharge tube having an insulating mask in which a plurality of slits are formed with similar pattern to that of cathode electrodes disposed on an insulating baseplate, said insulating mask being arranged between said insulating baseplate and an anode electrode with a narrow gap from said insulating plate.

3,617,794
HALOGEN LAMP EMPLOYING A QUARTZ ENVELOPE PROVIDED WITH A COLORED LAYER

Henricus Antonius Van Bakel, and Riksterus Aguste Johannes Maria Meijer, both of Emmasingel, Eindhoven, Netherlands, assignors to U. S. Philips Corporation, New York, N.Y.

Filed Dec. 6, 1968, Ser. No. 781,966
Claims priority, application Netherlands, Dec. 15, 1967, 6717090
Int. Cl. H01j *61/40, 61/38*
U.S. Cl. 313—112 **4 Claims**

A colored halogen lamp having a quartz envelope that has been coated with a layer of luster lacquer, essentially consisting of metal salts of resin acids dissolved in ethereal oils. The coating is fired up to temperatures between 500° C. and 600° C.

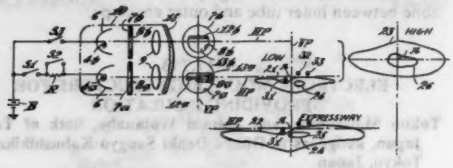
3,617,795
AUTOMOTIVE HEADLIGHT SYSTEM

Sandford C. Peek, Ipswich, Mass., assignor to Sylvania Electric Products Inc.

Filed Mar. 16, 1970, Ser. No. 19,882
Int. Cl. B60q *1/14, 1/16*
U.S. Cl. 313—117 **4 Claims**

An automobile headlight system comprises two elliptical reflectors each with a tungsten halogen lamp filament at or near one focus. From each reflector a light beam is projected through a light gate at the other focus and thence through a lens which cooperates with the elliptical reflector to throw a narrow light beam nearly parallel to the optical axis of the reflector and lens. The light gate before one lamp has a horizontally elongate aperture transmitting more light to the

right beyond the lens. The light gate before the other lamp has generally vertically symmetrical aperture and transmits light higher above the horizontal than the first-mentioned light gate. The lamps are electrically connected to a power supply with a switching system such that they can be



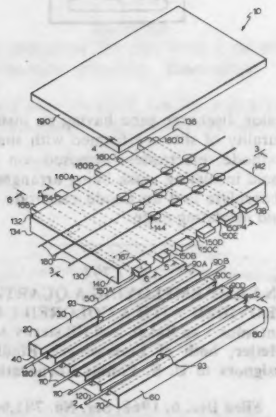
operated in three different modes: the first lamp at low voltage producing a low beam; the first lamp at higher voltage producing a low but brighter beam; and both lamps together producing a composite beam having high and low components.

3,617,796

DISPLAY PANEL CONSTRUCTION

Bernard Caras, Princeton, N.J., assignor to Burroughs Corporation, Detroit, Mich.

Filed Jan. 29, 1970, Ser. No. 6,839
Int. Cl. H01j *61/30*
U.S. Cl. 313—220 7 Claims



A gaseous display panel includes a top plate, a bottom plate, a center plate, and a plurality of arrays of electrodes associated therewith. The bottom plate, and the top plate if desired, are provided with slots, the center plate is provided with an array of holes, and the electrodes are arrayed to provide two layers of gas-filled glow cells. The various parts are constructed to provide optimum uniformity and thereby to achieve optimum operation with maximum economies and ease in construction.

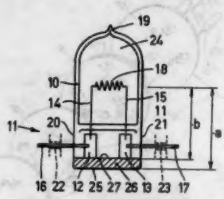
3,617,797

PINCH-BASE ELECTRIC LAMP WITH TRANSVERSELY ARRANGED SUPPLY WIRES

Riksterus Auguste Johannes Maria Meijer, Emmasingel, Eindhoven, and Jan Christiaan Pennekamp, Heerlen, both of Netherlands, assignors to U. S. Philips Corporation, New York, N.Y.

Filed May 14, 1969, Ser. No. 824,478
Claims priority, application Netherlands, May 16, 1968, 6806902
Int. Cl. H01j *5/48*
U.S. Cl. 313—318 5 Claims

A pinch-base lamp and method of making same where foils are sealed in the pinch, and secured to each foil are one end of a pole wire oriented generally parallel to the lamp axis and one end of a supply wire oriented at a right-angle to the pole wire. When the lamp is mounted the laterally extending supply wires are subjected to torsional instead of bending



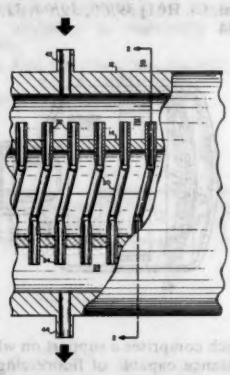
stress, thereby reducing the likelihood of fracturing the pinch, and the base of the pinch, being free of supply wires, may be ground to provide an accurate reference surface from the filament.

3,617,798

FLUID-COOLING SLOW WAVE INTERACTION STRUCTURE FOR A TRAVELING WAVE TUBE

Theodore J. Marchese, North Springfield; Sidney T. Smith, Alexandria, Va., and Henry D. Arnett, Washington, D.C., assignors to The United States of America as represented by the Secretary of the Navy

Filed July 22, 1970, Ser. No. 57,259
Int. Cl. H01j *25/34*
U.S. Cl. 315—3.5 6 Claims



A helical slow wave structure formed of hollow metal tubing communicating with inlet and outlet fluid manifolds through supporting hollow ceramic tubes brazed to the helix at every half turn. Fluid coolant flows from the inlet manifold through the ceramic tubes and into each half turn of the helix and then out through the ceramic tubes on the other side of the outlet manifold where it is pumped to a heat exchanger and then returned to the inlet manifold.

3,617,799

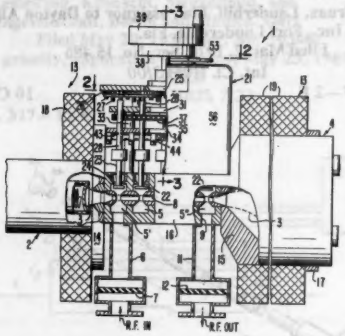
GANG TUNER FOR A MULTICAVITY MICROWAVE TUBE

Robert C. Schmidt, Woodside, and Walter E. Nelson, Sunnyvale, both of Calif., assignors to Varian Associates, Palo Alto, Calif.

Filed June 21, 1968, Ser. No. 739,016
Int. Cl. H01j *25/10*
U.S. Cl. 315—5.47 7 Claims

A multicavity microwave amplifier tube is disclosed. The tube includes a plurality of cavity resonators successively arranged along a beam path for successive electromagnetic interaction with the beam to produce output-amplified microwave energy. Translatable cavity tuners are provided within a plurality of the cavity resonators for tuning the

frequency of the resonators. The external tuning structure includes a plurality of rotatable cam wheels mechanically interconnected for synchronous rotation. Each cam wheel includes a set of cams. A plurality of cam followers are connected to the cavity tuners and each includes a bearing surface for engaging one of the cams in one the set of cams for tuning the respective cavity resonators in accordance with the position of the respective cam in the set of cams on the



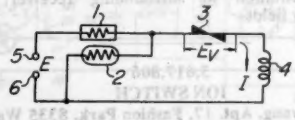
cam wheel. Means are provided for disengaging the cam followers from the cams before rotation of the cam wheels to new tuner positions. A stop is provided for the preventing rotation of the cam wheels while the cam followers are in engagement with the cams to alleviate wear on the engaging surfaces of the cams and the cam followers, whereby the microwave amplifier tube can be precisely and repeatedly tuned to certain preselected channel frequencies within a band of frequencies.

3,617,800

DEGAUSSING DEVICE FOR COLOR TELEVISION RECEIVER

Kazuo Ishikawa, Kadoma, and Hiroshi Yamashita, Neyagawa, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 20, 1970, Ser. No. 30,062
Claims priority, application Japan, May 6, 1969, 44/35884
Int. Cl. H01j *29/06*
U.S. Cl. 315—8 **1 Claim**



A degaussing device for color television receiver, wherein the degaussing time is extremely shortened and the current value flowing through the degaussing coil after the degaussing is completed is minimized by making elaborate use of the actions of a thermistor having a positive temperature coefficient, thermistor having a negative temperature coefficient and a varistor.

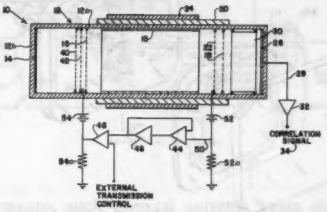
3,617,801

INTENSITY CONTROL AND SIGNAL ENHANCEMENT CORRELATION TUBE

James J. Hogan, Akron, Ohio, assignor to Goodyear Aerospace Corporation, Akron, Ohio

Filed May 23, 1968, Ser. No. 731,597
Int. Cl. H01j *31/48*
U.S. Cl. 315—11 **5 Claims**

The invention consists of a variable transmission field mesh which has the unique capability of isolating the uniform, accelerating electrostatic field in the photocathode region from the focus field in the drift tube while both regions are effectively isolated from the control signal. This isolation controls the electronic image intensity after the image has been generated by the photocathode, but before the image enters appreciably in the drift-tube region, without seriously degrading characteristics of the image tube such as sensitivity, resolution, and image distortion. The invention also contemplates intensity control of the output signal from the tube by actually sensing the intensity of the electron image as well as the transmisivity of the storage grid and feeding the resulting signal back to the variable transmission field mesh. A preferable construction is with a double-decked sandwich field mesh consisting of three conducting, aligned meshes



separated by two insulating or vacuum layers. The middle mesh is the control mesh while the one facing the photocathode controls the field at the photocathode and the mesh facing the drift-tube maintains the drift-tube electrostatic field at essentially zero. The potential on the control mesh may vary from a value considerably below the potentials of the other two meshes for low transmission to considerably above for high transmission.

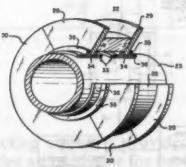
Essentially, the invention relates to an electronic iris for controlling intensity of the signal in an electronic correlation tube through signal enhancement or intensity control utilizing a control mesh in association with the storage grid.

3,617,802

TRAVELING-WAVE TUBE

Arthur E. Manoly, Palos Verdes Peninsula, Calif., assignor to The United States of America as represented by the Secretary of the Navy

Filed May 6, 1970, Ser. No. 34,933
Int. Cl. H01j *25/34*
U.S. Cl. 315—3.5 **6 Claims**



A traveling-wave tube including an improved permanent magnet assembly for collimating an electron beam. The assembly comprises a plurality of ferromagnetic pole piece hubs spaced along the tube with annular channels for the insertion of ferromagnetic segmented arcuately formed pole pieces. Annular magnets are slidable over the outer periphery of the pole piece hubs and alternately spaced between the adjacent segmented pole pieces.

3,617,803

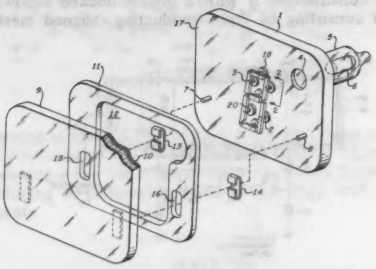
RAISED-CATHODE GAS DISCHARGE INDICATOR HAVING A SPUTTER SHIELD

James W. Wheeler, Scottsdale, Ariz., assignor to Sperry Rand Corporation

Filed Nov. 14, 1969, Ser. No. 876,618
Int. Cl. H01j *61/04*
U.S. Cl. 313—207 **3 Claims**

A gas discharge indicating device comprising a plurality of symbol-forming cathode elements disposed intermediate a

cathode-supporting substrate and a transparent anode connected to one another in a manner to form a hermetically sealed enclosure for containing an ionizable gas, the cathode elements being supported in spaced relation to both the anode and substrate on pins passing through the latter. An insulating shield is provided on each support pin proximate the substrate preferably in noncontacting relation therewith. Under appropriate conditions of gas pressure and anode-



cathode and cathode-substrate spacing, localized glow discharges between the anode and selectively energized cathodes are confined to the regions therebetween, resulting in minimized sputtering from the substrate side of the cathode. This feature in combination with the insulating shields operates to preclude sputtered shorting contacts from developing between the respective support pins in the region of the substrate.

3,617,804

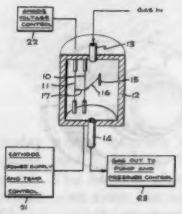
CONTINUOUS PLASMA LIGHT SOURCE

Thomas O. Paine, Administrator of the National Aeronautics and Space Administration with respect to an invention of; Willard F. Libby; Carl A. Jensen, and Lowell L. Wood all of Los Angeles, Calif.

Continuation of application Ser. No. 479,357, Aug. 12, 1965, now abandoned. This application Oct. 14, 1969, Ser. No. 866,442

Int. Cl. H01j *61/16, 61/28, 61/78*

U.S. Cl. 315—326 **1 Claim**



A light source apparatus for producing intense monochromatic light from a low-temperature plasma is disclosed. The light source apparatus comprises a housing member for confining a gas at subatmospheric pressure, the housing containing output means disposed to transmit light from the confined gas. At least one anode and one cathode are positioned within the gas in electrical circuit relationship with each other. First control means are provided for controlling the voltage applied to the anode and second control means independently control the temperature of the cathode by regulating the power supplied to it. The pressure of the gas is controlled by a third control means. An intense monochromatic light output is achieved by confining the gas in said chamber at a controlled predetermined reduced pressure, independently controlling the temperature of the electron emitting cathode by means of said second control means and applying a predetermined controlled low voltage to said anode by said first control means. An intermediate mode current is drawn from said cathode and produces in the confined gas a region having a high density of metastable atomic states. A low-temperature, high-density plasma is continuously produced in said region and intense monochromatic light is emitted as a result of the recombination of ions and electrons in said plasma.

3,617,805

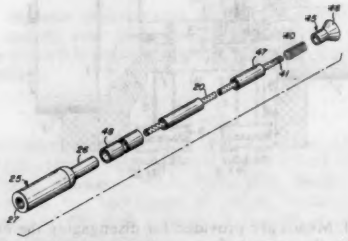
LOW-NOISE STATIC DISCHARGER DEVICE

Robert L. Truax, Lauderhill, Fla., assignor to Dayton Aircraft Products, Inc., Fort Lauderdale, Fla.

Filed Mar. 2, 1970, Ser. No. 15,486

Int. Cl. H05f *3/00*

U.S. Cl. 317—2 E **10 Claims**



A static discharging device for use on an aircraft includes a resistance element having one end electrically attached to the aircraft and a plurality of resistively separated metallic fibers of substantially constant diameter of 10 microns or less and a length of less than one-half inch attached to its other end. The resistance element is preferably a nylon substrate having a carbon-impregnated plastic coating thereon to provide a controlled resistance of 20 to 80 megohms over its length. A lightning diverter element may also be included with the static discharge device and includes a separate semiconductive strip on which may be placed a plurality of spaced-apart aluminum disks which will support an external ion plasma and thus prevent a large amount of energy from being dissipated in the static discharger resistance element and at the same instance providing lightning protection in the immediate region of the discharger's installation. The discharger also provides a nominal minimum of 50 db. of radiofrequency noise quieting regardless of its physical or electrical orientation to surrounding receiver antenna radiofrequency fields.

3,617,806

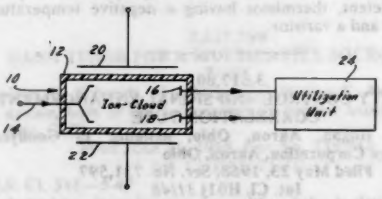
ION SWITCH

Ralph G. Lillevang, Apt. 17, Fashion Park, 8335 Washington Blvd., Pico-Rivera, Calif.

Filed Nov. 13, 1969, Ser. No. 876,238

Int. Cl. H01h *36/00*

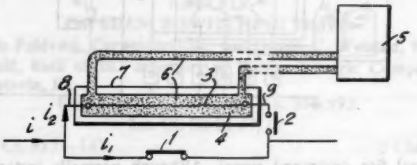
U.S. Cl. 317—4 **9 Claims**



This invention relates to a multipurpose electronic device that can be used as a switch, as a binary signal generator, as a comparator, as a variable resistor and as a frequency mul-

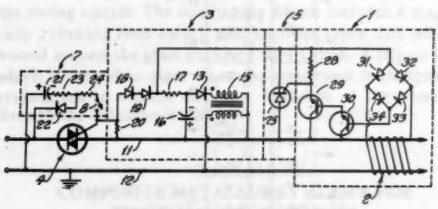
tiplier—among other uses. Basically, it comprises an envelope containing a cloud of ions; and as selected control signals are applied to the device the ions are directed to selected output electrodes.

3,617,807
CURRENT-LIMITING SWITCH EMPLOYING LOW-TEMPERATURE RESISTOR
Fritz Kesselring, Kusnacht, Switzerland, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany
Filed May 20, 1970, Ser. No. 39,040
Claims priority, application Germany, May 23, 1969, P 19 26 972.8
Int. Cl. H02h *7/22*
U.S. Cl. 317—11 E **6 Claims**



A circuit interrupter is provided with a parallel-connected resistor which is cooled to a temperature of from 4° K. to 80° K., but higher than the critical temperature of the resistance material. The resistor is connected in parallel with the circuit interrupter contacts at either an arbitrary time or just prior to a current zero value. The heating of the resistor during current-limiting operation increases its resistivity by about 100 times.

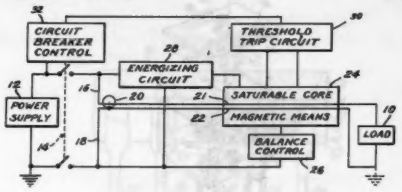
3,617,808
ELECTROCUTION PREVENTION CIRCUIT
Max N. Yoder, 3968 Second St., S.W., Washington, D.C.
Filed May 21, 1970, Ser. No. 40,469
Int. Cl. H02h *3/16, 3/28*
U.S. Cl. 317—18 D **10 Claims**



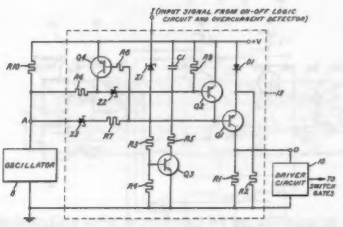
A circuit which prevents accidental electrocution is described. It may be used as an integral part of the electrical service entrance panel or in individual branch circuits, and operates on the principle of interrupting the current in a period of time so short as to prevent ventricular fibrillation.

3,617,809
ELECTRONIC SAFETY SYSTEM
Thomas C. Penn, Richardson, Tex., and Arthur L. Reenstra, Attleboro, Mass., assignors to Texas Instruments Incorporated, Dallas, Tex.
Filed May 15, 1970, Ser. No. 37,560
Int. Cl. H02h *3/28*
U.S. Cl. 317—18 D **19 Claims**

An electronic safety system is disclosed for detecting leakage of electrical signals from a load circuit to ground in order to selectively disrupt the supply of power to the load circuit. A pair of electrical conductors couple the load circuit to the source of power. At least a portion of the pair of electrical conductors intermediate the load circuit and the power supply comprises a section of coaxial electrical cable inductively coupled to a selectively energizable saturable core magnetic means, which is connected to an energizing circuit adapted to establish a magnetic field within the saturable core magnetic means. Means are coupled to the saturable core magnetic means for sensing affects on the magnetic field generated by the presence of unequal currents in the section of the coaxial cable inductively coupled to the saturable core magnetic means, such unequal currents being due to the leakage of current from one of the conductors to ground. Such affects are arranged to produce an electrical output signal, which may be utilized for effecting operation of a circuit breaker to disrupt the power being supplied to the load.



3,617,810
TURN-ON DIRECTING CIRCUIT FOR STATIC SWITCH
Floyd L. Steen, Lansdowne, Pa., assignor to General Electric Company
Filed Aug. 7, 1970, Ser. No. 61,904
Int. Cl. H02h *3/08*
U.S. Cl. 317—33 SC **4 Claims**

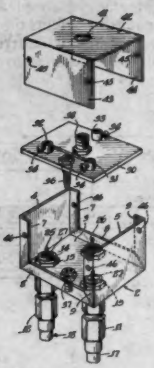


A turn-on directing circuit is provided for a static switch. The switch includes an oscillator for producing a train of discrete control signals, control signal enabling means and logic circuit means. When switch conduction is desired an ON signal is provided to the enabling means to enable said means to effect switch turn-on. The turn-on directing circuit includes a supervisory circuit which temporarily disables the enabling means if a control signal is in existence when the ON signal is given and for reenabling the enabling means in time to allow the first successive control signal following the ON signal to effect switch turn-on.

3,617,811
CABLE TELEVISION TAPOFF UNIT
David S. McVoy, Gainesville, Fla., assignor to Coaxial Scientific Corporation, Alachua, Fla.
Filed July 22, 1970, Ser. No. 57,182
Int. Cl. H01p *5/14;* **H03h** *7/48*
U.S. Cl. 317—99 **7 Claims**

A cable television tapoff unit comprises a housing into which coaxial cables are connected and which is used with modularized circuit boards which are of similar physical configuration and are interchangeably mounted in the housing so

that a given housing may be used as or converted to a line splitter, directional coupler, housedrop, etc. The circuit



boards contain all of the circuitry for the unit and the housing is free of integrally wired-in components.

3,617,812

PROTECTIVE DEVICE FOR POWER SUPPLY SYSTEMS

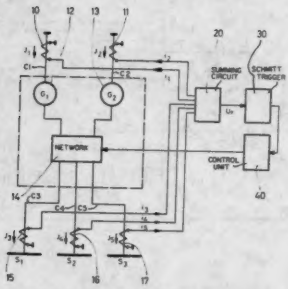
Burkhard Deter, Munich, Germany, assignor to Messerschmitt-Bolkow-Blohm, Munich, Germany

Filed Nov. 26, 1969, Ser. No. 880,138

Claims priority, application Germany, Nov. 28, 1968, P 18 11 422.2

Int. Cl. H02h *3/28*

U.S. Cl. 317—27 **7 Claims**



A differential protective device for providing short circuit protection for electrical networks such as airborne power supply systems includes a series of current transformers for monitoring the input and output leads of a network and a summing circuit for summing the output signals from the current transformers. Where a fault exists in the network a non-zero current summation will result and a corresponding output voltage produced by the summing circuit. The output voltage is applied to a comparator circuit which is connected to a control unit for controlling a programmed switching operation within the network to locate the fault.

3,617,813

INTERVALOMETER AND TIMING OSCILLATOR

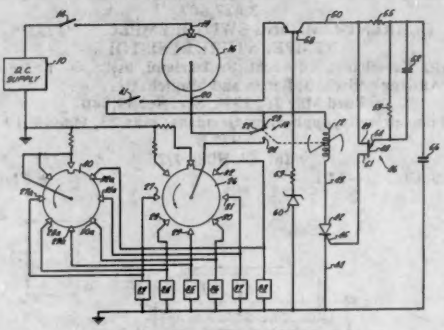
Charles E. Everest, Corona Del Mar, Calif., assignor to William Wahl Corporation, Los Angeles, Calif.

Filed Aug. 11, 1970, Ser. No. 62,948

Int. Cl. F23g *7/02*

U.S. Cl. 317—80 **22 Claims**

An intervalometer for firing one or a group of ordnance devices comprises a normally self-stepping electromechanical solenoid-operated switching device and a separate independent timing oscillator. The oscillator is connected to the stepping switch to externally trigger initiation of each step of the switch and is arranged to permit substantially instantaneous actuation of the intervalometer upon receipt of the elec-



trical fire command signal. Although normally instantaneously starting, the oscillator is provided with a delay to accommodate bounce time of pilot-operated firing switches. Continued oscillator operation in the event of temporary power dropout is provided.

3,617,814

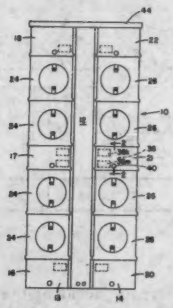
CONCEALED-HINGE MOUNTING FOR RAINTIGHT COVER OF MULTIMETERING ELECTRICAL PANELBOARD

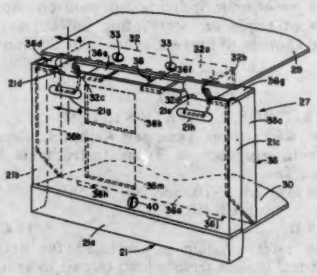
Harris I. Stanback, Lexington, Ky., assignor to Square D Company, Park Ridge, Ill.

Filed Mar. 2, 1970, Ser. No. 15,370

Int. Cl. H02b *9/00;* **E05d** *7/00*

U.S. Cl. 317—106 **10 Claims**





A circuit breaker compartment in a column of watt-hour meter socket compartments is partially defined by a pair of

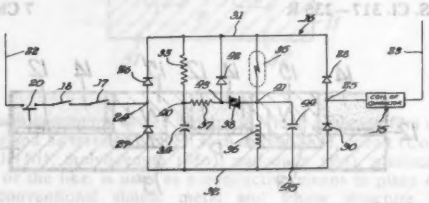
vertically spaced, horizontally extending partitions. A mounting bracket secured to an upper one of the partitions has a depending rear portion and a pair of spaced depending front leg portions. An interior trim panel is secured to the rear portion of the bracket and anchored in a lower one of the partitions. A front cover having a pair of horizontally spaced slots in an upper edge portion is mounted on the front leg portions of the bracket and secured in closed position by a screw extending through a lower edge portion of the cover into threaded engagement with the interior trim panel. The slotted upper edge portion of the cover is normally covered by a depending lip portion of a front cover for a meter socket compartment spaced immediately above the circuit breaker compartment.

3,617,815

IMPEDANCE SWITCHING TIMER

Ernie Foldvari, Carpentersville, and Dennis C. Walstad, Winfield, both of Ill., assignors to Furnas Electric Company, Batavia, Ill.

Filed Sept. 18, 1969, Ser. No. 858,993
Int. Cl. H01h *47/18*
U.S. Cl. 317—142 **3 Claims**



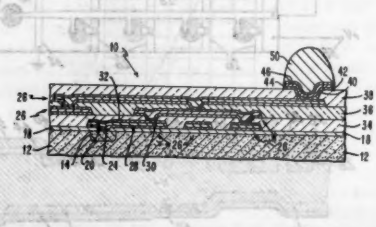
The timing circuit is connected in series relation with the coil of a contactor and the same includes a charging circuit and a conducting circuit. A resistor of high ohmic value and a series connected condenser form the charging circuit. Since the resistor is relatively high in ohms the charging of the condenser is delayed to give the desired time delay interval to the timing circuit. The conducting circuit includes a magnetically actuated reed switch and an inductance coil which is wound around the glass enclosed reed switch. A trigger diode which is caused to close when the condenser is charged to a predetermined voltage effects a discharge of the condenser through the inductance coil.

3,617,816

COMPOSITE METALLURGY STRIPE FOR SEMICONDUCTOR DEVICES

Jacob Riseman, and Paul A. Totta, both of Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 2, 1970, Ser. No. 7,618
Int. Cl. H01l *3/00, 5/00*
U.S. Cl. 317—234 R **6 Claims**



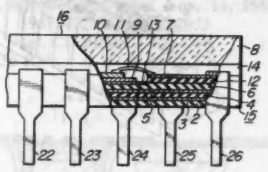
A metallurgy interconnection system for semiconductor devices made up of laminar stripes, each having a layer of gold disposed between layers of tantalum.

3,617,817

LAMINATED CERAMIC STRUCTURE FOR CONTAINING A SEMICONDUCTOR ELEMENT

Fumimaro Kawakatsu, Koganei-shi; Takahiko Ihochi, Kodaira-shi, and Takahiro Okabe, Hachioji-shi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 23, 1969, Ser. No. 887,681
Claims priority, application Japan, Dec. 25, 1968, 43/94538
Int. Cl. H01l *5/00*
U.S. Cl. 317—234 R **8 Claims**



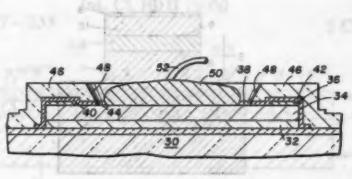
A package having a bottom plate comprises by laminating at least two ceramic plates, in which a semiconductor substrate including an integrated circuit is fixed on the principal surface of said bottom plate and a conducting layer with low resistivity is extended between said ceramic plates, an operating current being supplied to said integrated circuit through the conducting layer, thus the ohmic loss is reduced at the time of supplying the operating current.

3,617,818

CORROSION-RESISTENT MULTIMETAL LEAD CONTACT FOR SEMICONDUCTOR DEVICES

Clyde R. Fuller, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 31, 1968, Ser. No. 788,264
Int. Cl. H01l *3/00, 5/00*
U.S. Cl. 317—234 R **8 Claims**



A gold-bonding area is exposed by an opening in the upper molybdenum layer of a trimetal molybdenum-gold-molybdenum contact system for a semiconductor device. A layer of chromium, or other suitable corrosion-resistant material, is formed over the edges of the molybdenum layers and extends for a distance over the exposed gold-bonding area in order to seal the edges of the molybdenum layers. An insulation layer is formed over the layer of chromium and selectively removed to define an opening exposing the gold-bonding area. In one embodiment, a second layer of gold is formed over the edges of the chromium layer, with the insulation layer abutting the outer edges of the second gold layer.

3,617,819

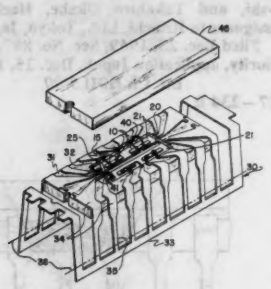
A SEMICONDUCTOR DEVICE HAVING A CONNECTING PAD OF LOW RESISTIVITY SEMICONDUCTOR MATERIAL INTERCONNECTING GOLD ELECTRODES AND ALUMINUM CONTACTS OF AN ENCLOSURE

Alfred R. Boisvert, Hillsboro, and Wilfred L. Boule, Antrim, both of N.H., assignors to Sylvania Electric Products Inc.

Filed Oct. 15, 1970, Ser. No. 81,017
Int. Cl. H01l *3/00, 5/00*
U.S. Cl. 317—234 R **4 Claims**

A semiconductor device including the combination of an enclosure having leads with aluminum contact regions and a body of silicon having a gold electrode. The connecting path between the gold electrode and the aluminum contact region of a lead includes a connecting pad of low resistivity silicon

with a layer of gold on one surface and a layer of aluminum on the other. Thus, direct gold-to-aluminum connections



which produce harmful gold-aluminum compounds at elevated temperatures are avoided.

3,617,820

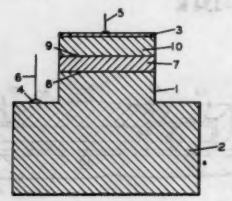
INJECTION-LUMINESCENT DIODES

Arno Henry Herzog, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.

Continuation-in-part of application Ser. No. 509,598, Nov. 24, 1965, now Patent No. 3,419,742. This application Nov. 18, 1966, Ser. No. 595,363. The portion of the term of the patent subsequent to Dec. 31, 1985, has been disclaimed

Int. Cl. H01l 9/00

U.S. Cl. 317—234 **10 Claims**



This disclosure relates to injection-luminescent diodes of gallium arsenide, gallium phosphide and mixed binary crystals thereof having the formula $GaAs_xP_{1-x}$, where x is a numerical value greater than zero and less than one, said diodes having an N-type conductivity region doped to a carrier concentration of from 10^{15} to 10^{19} carriers/cc. of N-type impurity atoms and a substantially linearly graded PN junction merging with a radiative recombination band which extends from about 5 to 25 microns into a region of P-type conductivity and is doped with P-type impurity atoms to a carrier concentration of about 4×10^{19} carriers/cc. at the distal edge of said band from the PN junction. The injection-luminescent diodes of this invention are produced by a diffusion process.

3,617,821

HIGH-VOLTAGE TRANSISTOR STRUCTURE HAVING UNIFORM THERMAL CHARACTERISTICS

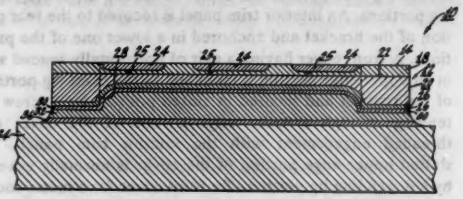
Willem Gerard Einthoven, Belle Meade, N.J., assignor to RCA Corporation

Filed Sept. 17, 1970, Ser. No. 73,028

Int. Cl. H01l 1/12

U.S. Cl. 317—235 **4 Claims**

A high-voltage transistor is formed in a semiconductor body having two opposed major surfaces. The transistor has emitter, base, and collector regions, with the emitter-base junction extending to a first one of the surfaces, and with the collector region extending to the second surface. A nickel layer is disposed on the second surface, and a layer of a thermally conductive metal of about the same thickness as the



semiconductor body, or greater, is integrally joined to the nickel layer.

3,617,822

SEMICONDUCTOR INTEGRATED CIRCUIT

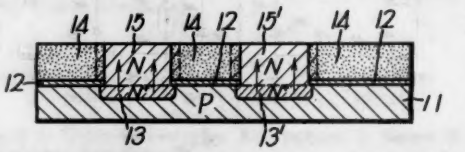
Isamu Kobayashi, Yokohama-shi, Japan, assignor to Sony Corporation, Tokyo, Japan

Continuation-in-part of application Ser. No. 780,702, Dec. 3, 1968. This application Oct. 29, 1969, Ser. No. 872,335

Claims priority, application Japan, Dec. 12, 1967, Oct. 30, 1968, Oct. 30, 1968 42/78032; 43/79129; 43/79130

Int. Cl. H01l 19/00

U.S. Cl. 317—235 R **7 Claims**



A semiconductor integrated circuit comprising single crystal regions isolated from each other by means of high-resistance polycrystalline regions and PN junctions. The polycrystalline regions and the single crystal regions and doped with the same impurity concentration but the resistivity of the polycrystalline regions is much greater than that of the single crystal regions.

3,617,823

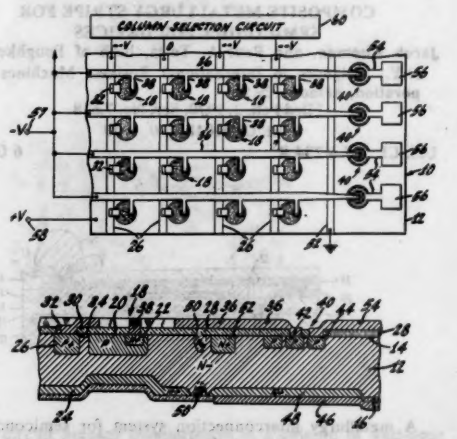
SELF-SCANNED PHOTOTRANSISTOR ARRAY EMPLOYING COMMON SUBSTRATE

Steven R. Hofstein, Princeton, N.J., assignor to RCA Corporation

Filed Mar. 7, 1969, Ser. No. 805,237

Int. Cl. H01l 11/14

U.S. Cl. 317—235 **13 Claims**



A planar phototransistor array having relatively fast response time and being efficiently sensitive to radiation in

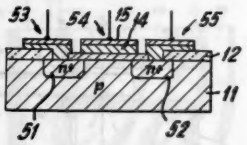
the near infrared includes a plurality of phototransistors arranged in rows and columns and conductive means which may be selectively coupled by means of an insulated gate enhancement structure to the base regions of each of the transistors. In operation, all transistors are normally biased into a nonconductive condition, but selected ones of the transistors may be biased into photoconduction and provide outputs representative of the light falling thereon.

3,617,824

MOS DEVICE WITH A METAL-SILICIDE GATE

Daizaburo Shinoda; Masaoki Ishikawa; Hiroki Muta; Shizuo Asanbe, and Nobuo Kawamura, all of Tokyo, Japan, assignors to Nippon Electric Company, Limited, Tokyo, Japan

Filed July 10, 1968, Ser. No. 743,900
Claims priority, application Japan, July 12, 1965, Dec. 12, 1967, Dec. 12, 1967, 42/44848; 42/79658; 42/79660
Int. Cl. H01l *11/14*
U.S. Cl. 317—235 R 3 Claims



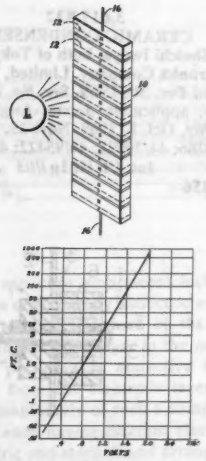
A semiconductor device obtains in which a silicide film of 3*d*, 4*d* and 5*d* transition metal such as iron (Fe), cobalt (Co), nickel (Ni), molybdenum (Mo), palladium (Pd), platinum (Pt), or the like, is used as a conductive means in place of the conventional simple metal and whose structure is semiconductor-insular-silicide.

3,617,825

MULTIJUNCTION PHOTODIODE DETECTOR

George E. Chilton, 144 Valley Road, Haworth, N.J., and Karabet Simonyan, 10 Graham Court, Saddle Brook, N.J.

Filed Dec. 23, 1968, Ser. No. 785,927
Int. Cl. H01l *15/00*
U.S. Cl. 317—234 1 Claim



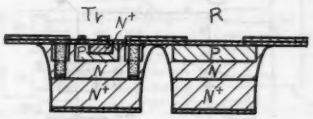
A stack of semiconductors are arranged with the edge of the junctions exposed to a source of light whose intensity is to be measured. There is a resulting output voltage which is virtually independent of the exposed area. This characteristic permits high-output devices of small size.

3,617,826

AN INTEGRATED TRANSISTOR WITH A POLYCRYSTALLINE CONTACT TO A BURIED COLLECTOR REGION

Isamu Kobayashi, Kanagawa-ken, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Nov. 12, 1968, Ser. No. 774,703
Claims priority, application Japan, Nov. 14, 1967, Dec. 21, 1967, 42/73155; 42/82053
Int. Cl. H01l *11/00, 7/36*
U.S. Cl. 317—235 R 5 Claims



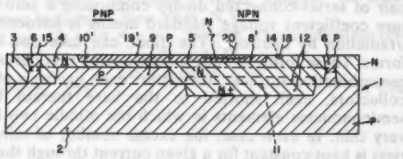
Semiconductor devices of the integrated circuit type including contiguous semiconductor regions, portions of these regions containing both a polycrystalline area and a single crystal area.

3,617,827

SEMICONDUCTOR DEVICE WITH COMPLEMENTARY TRANSISTORS

Albert Schmitz; Cornelis Mulder, and Arie Slob, all of Emmasingel, Eindhoven, Netherlands

Division of Ser. No. 676,235, Oct. 18, 1967. Filed Mar. 30, 1970, Ser. No. 23,784
Claims priority, application Netherlands, Oct. 21, 1965, 6614858
Int. Cl. H01l *19/00*
U.S. Cl. 317—235 3 Claims



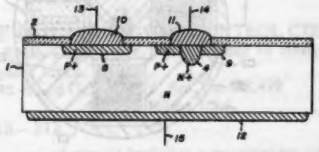
A semiconductor device comprising complementary transistors is described. Both transistors are made in a single island and each include a buried layer. The PNP transistor uses the buried layer as collector, and the NPN transistor uses the buried layer to reduce collector resistance. The result is a fast-switching NPN transistor.

3,617,828

SEMICONDUCTOR UNIJUNCTION TRANSISTOR DEVICE HAVING A CONTROLLED CROSS-SECTIONAL AREA BASE CONTACT REGION

Samyon E. Daniluk, Camillus, N.Y., assignor to General Electric Company

Filed Sept. 24, 1969, Ser. No. 860,504
Int. Cl. H01l *11/14*
U.S. Cl. 317—235 R 1 Claim



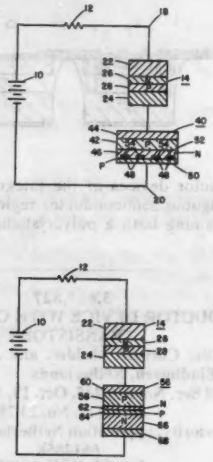
A semiconductor device including a contact region of one conductivity region having a predetermined cross-sectional

area is provided with a surrounding collar-shaped semiconductor region of opposite conductivity type, which region effectively blocks the spreading action of the contact region thereby controlling its resistance to a constant value.

3,617,829
RADIATION-INSENSITIVE VOLTAGE STANDARD MEANS

Israel Arnold Lesk, Scottsdale, Ariz., assignor to Motorola, Inc., Franklin Park, Ill.

Filed Dec. 1, 1969, Ser. No. 881,257
Int. Cl. H011 *9/00*
U.S. Cl. 317—235 R **8 Claims**

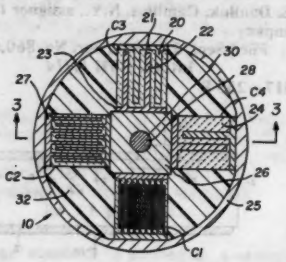


A diode which is used as the forward-biased element of a pair of series-connected diodes comprising a zero temperature coefficient voltage standard means is hardened against irradiation by neutrons. The diode can take one of several forms. These forms include diodes having thin bases and high recombination surfaces, transistors each having a plurality of collectors, each shorted to the base thereof four-layer semiconductor elements in which the middle two layers are very thin. In each case, the excess number of minority carriers is kept constant for a given current through the forward-biased element, resulting in an unchanged voltage drop at a given current after neutron irradiation.

3,617,830
MINIATURE FEED-THROUGH WIDE BAND BYPASS CAPACITOR ASSEMBLY

Vincent F. Perna, Jr., Centerport, N.Y., assignor to Phase Industries Incorporated, Huntington, N.Y.

Filed Apr. 30, 1970, Ser. No. 33,225
Int. Cl. H01g *5/00*
U.S. Cl. 317—242 **10 Claims**

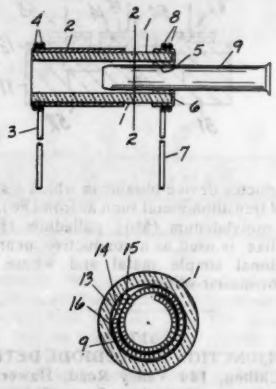


A miniature capacitor assembly comprises a plurality of capacitors each having laterally spaced plates embedded in a ceramic block with alternate plates terminating in contact members at opposite ends of the block. The capacitors are disposed in circumferentially spaced radial array inside a conductive ring with a conductive member at the center of the ring. The contact members contact the ring and conductive member respectively so that the capacitors are effectively in parallel with each other. The capacitors have different capacitance values whereby the assembly has an overall attenuation-frequency characteristic which is substantially flat over a range as high as 14 gigahertz.

3,617,831
TUBULAR TRIMMER CAPACITOR WITH AN INTERNAL MOVABLE ELECTRODE OF AN AXIALLY WOUND SPIRAL OF MORE THAN ONE TURN OF SPRING METAL

John F. Moulthrop, McKean, Pa., assignor to Erie Technological Products, Inc., Erie, Pa.

Filed Mar. 5, 1970, Ser. No. 16,767
Int. Cl. H01g *5/01, 5/24*
U.S. Cl. 317—249 T **2 Claims**

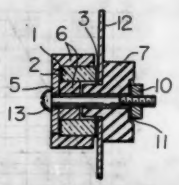


A capacitor having a tubular dielectric with a stationary external electrode and a tubular internal movable electrode of an axially wound spiral of more than one turn of spring metal having its unstressed outside diameter greater than the inside diameter of the bore of the dielectric.

3,617,832
CERAMIC CONDENSERS

Shiro Ito, and Shoichi Iwaya, both of Tokyo, Japan, assignors to TDK Electronics Company, Limited, Tokyo, Japan

Filed Dec. 30, 1969, Ser. No. 889,215
Claims priority, application Japan, Aug. 26, 1969, Sept. 3, 1969, Oct. 8, 1969, Oct. 8, 1969, Nov. 25, 1969, Nov. 27, 1969, 44/80476; 44/83286; 44/79991; 44/95422; 44/112334; 44/112750
Int. Cl. H01g *1/03*
U.S. Cl. 317—256 **3 Claims**



A ceramic condenser which comprises a combination of a cylindrical ceramic dielectric member having metal electrodes at both end surfaces and an insulator having a projection to be engaged in central through hole of the dielectric member. The member is provided with a connecting metal fixture as butted against one of the electrodes at the side op-

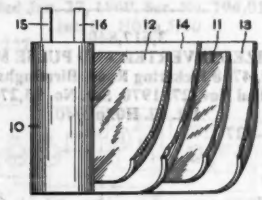
posite to the one receiving the insulator. A synthetic resin is molded around outer and inner peripheries of the dielectric member so as to expose the connecting metal member and the other electrode. The connecting fixture has a conductor extending through the central through holes of the dielectric member and the insulator, and threaded at its end so as to be fastened by means of a nut, so that a panel shape metal connecting plate will be held between the dielectric member and insulator as butted against exposed electrode of the member.

3,617,833

SILICATE-IMPREGNATED POLYOLEFIN CAPACITOR

Sidney D. Ross, Williamstown, Mass., and Raynor Linzey, Stamford, Conn., assignors to Sprague Electric Company, North Adams, Mass.

Filed Feb. 9, 1970, Ser. No. 9,713
Int. Cl. H01g 3/175
U.S. Cl. 317—258 6 Claims



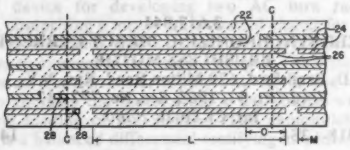
Polyolefin film dielectric capacitors are impregnated with a dielectric of a tetraalkyl orthosilicate to yield high corona starting voltage capacitors.

3,617,834

MONOLITHIC CAPACITOR COMPONENTS AND PROCESS FOR PRODUCING SAME

Charles C. Rayburn, Glenview, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Aug. 31, 1970, Ser. No. 68,272
Int. Cl. H01g 3/26
U.S. Cl. 317—261 11 Claims



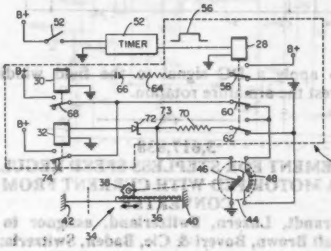
A monolithic capacitor component includes at least first and second layers separated by dielectric material and having nonoverlapping terminal portions of the electrode layers. Aligned with each electrode layer in the nonoverlapped area of the terminal portion is a nonactive electrode segment which is spaced from the electrode layer with which it is aligned. In the manufacture of such a component at least two electrode layers each having discrete electrode sections are separated dielectric and stacked and arranged relative to one another to provide overlapped terminal portions of the discrete electrode sections in the electrode layers whereby it is possible to sever the stacked and arranged dielectric and electrode layers in the area of the overlapped terminal portions to provide monolithic capacitor constructions.

3,617,835

OPERATING MEANS FOR RECIPROCATING MECHANISM

Stephen T. Dreher, Cornwells Heights, Pa.; John W. Marchetti, Cherry Hill, N.J., and Gary H. Stock, Fairless Hills, Pa., assignors to The Budd Company, Philadelphia, Pa.

Filed Sept. 29, 1969, Ser. No. 861,667
Int. Cl. H02p 3/00
U.S. Cl. 318—266 6 Claims



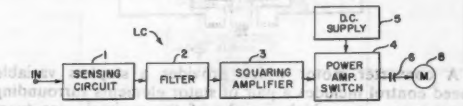
A bidirectional motor includes armature and field windings. A switching circuit connects power to drive the motor in a first direction. A detector is responsive to a decrease in the current flow in the armature winding to stop the motor and then switch the switching circuit to apply the power to drive the motor in a second direction.

3,617,836

CONTROL CIRCUIT FOR SYNCHRONOUS MOTOR

Donald E. Henry, Davenport, Iowa, assignor to Gulf & Western Industries, New York, N.Y.

Filed July 18, 1968, Ser. No. 749,558. This application filed under rule 47.
Int. Cl. H02p 5/34
U.S. Cl. 318—171 11 Claims



A control circuit is disclosed herein for applying signals to an inductive load, such as the winding of a synchronous motor. The circuit includes means for producing essentially a square wave signal together with a capacitor for coupling the signal to the inductive load. The average current impressed across and, hence, power consumed by the inductive load is limited by the capacitor in such a manner to prevent destruction of the inductive load at low frequencies.

3,617,837

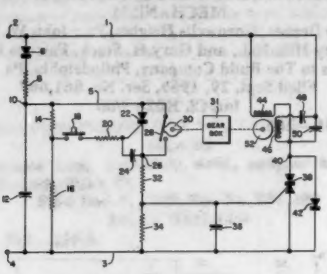
PULSE ACTUATED MOTOR CONTROL CIRCUIT

Francis J. Beck, Churchville, Pa., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 6, 1970, Ser. No. 78,499
Int. Cl. H02p 3/24
U.S. Cl. 318—212 5 Claims

A motor control circuit includes a momentary contact closure which actuates a switching means to apply an AC signal to the motor field windings causing rotation of the motor ar-

mature. Means are also provided to detect a predetermined rotational movement of the armature and, upon attainment



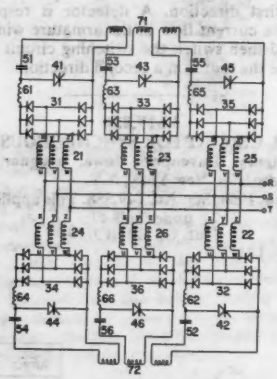
thereof, to apply a DC signal to the field windings and thereby arrest the armature rotation.

3,617,838

ARRANGEMENT FOR STEPLESS SPEED REGULATION OF A MOTOR FED WITH CURRENT FROM A CONVERTER

Armand Brandt, Luzern, Switzerland, assignor to Aktiengesellschaft Brown, Boveri & Cie, Baden, Switzerland

Filed Jan. 23, 1970, Ser. No. 5,172
Claims priority, application Switzerland, Jan. 28, 1969, 1,487/69
Int. Cl. H02p *5/28*
U.S. Cl. 318—225 R **4 Claims**



A converter motor which provides a stepless variable speed control includes a pair of stator elements surrounding a common rotor which may be of the squirrel cage type. Each stator of the motor is provided with at least two open three-phase winding systems supplied from a three-phase mains and which are connected periodically with cyclically interchanged phase sequence by way of a controllable valve group to form a star point. The individual valve groups are controlled periodically with a frequency *f2* which is different from the mains frequency *f1* supplying the three-phase windings so that the star points of the three-phase stator winding systems are periodically closed and opened to thus establish a rotary stator field which rotates with a frequency equal to *f2*–*f1* and which reacts with the rotor to drive the rotor at the rotational frequency of the stator field.

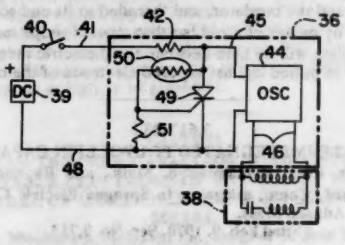
3,617,839

BRUSHLESS MOTOR AND INVERTER

Arthur Hill, North Olmsted, Ohio, assignor to Lear-Siegler, Inc., Maple Heights, Ohio

Filed Dec. 1, 1969, Ser. No. 881,085
Int. Cl. H02p *5/40*
U.S. Cl. 318—225 **7 Claims**

A control system and power supply for energizing a single-phase AC motor from a DC source for critical brush wear applications utilizing a solid-state inverter circuit and an auxiliary start winding for the motor continuously energized through a capacitor connection. An automatic shutdown feature for the motor-inverter combination is included for loss



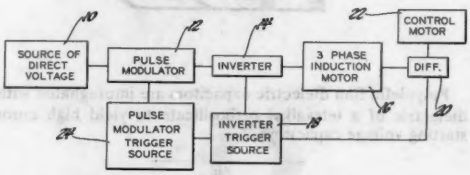
of fluid heat sink in fluid environments comprising a temperature responsive sensing element, an SCR trigger device and a power interrupter activated thereby.

3,617,840

SYNCHRONIZED INVERTER AND PULSE MODULATOR

Jalal T. Salihi, 4718 Pickering Road, Birmingham, Mich.

Filed Nov. 27, 1970, Ser. No. 93,276
Int. Cl. H02p *5/40*
U.S. Cl. 318—227 **2 Claims**



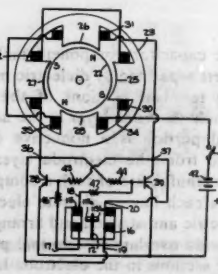
A synchronized controlled rectifier inverter and controlled rectifier pulse modulator system providing an AC output voltage when supplied a direct voltage input. The pulse modulator is connected between the inverter and a source of direct voltage to regulate the DC level supplied the inverter. In operation, controlled rectifiers in the pulse modulator are gated in synchronism with the gating of controlled rectifiers in the inverter. This synchronization is effected by an oscillator angle control and differentiator circuit which develops the necessary trigger signals.

3,617,841

SELF-SYNCHRONIZING DIRECT CURRENT BRUSHLESS MOTOR

Harrison D. Brailsford, 670 Milton Road, Rye, N.Y.

Filed Oct. 31, 1968, Ser. No. 772,112
Int. Cl. H02k *29/00*
U.S. Cl. 318—254 **14 Claims**



The disclosed invention is a synchronized motor operated by direct current and having a synchronizer in the form of a

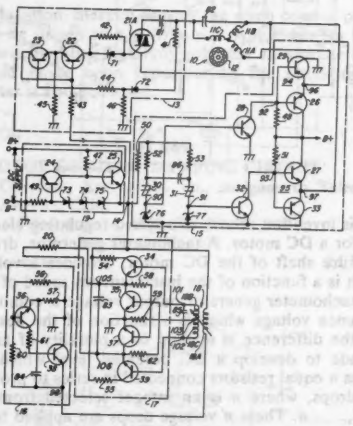
mechanical oscillator. The motor has a permanent magnet rotor and stator coils commutated by solid-state elements to produce magnetic pulses properly phased to keep the rotor turning. The mechanical oscillator has a member that oscillates at a natural frequency in response to the interaction of a permanent magnet and the pulsed field of a driving coil. The driving coil is connected to the stator coil section of the motor to receive a pulse, or oscillatory, driving signal therefrom. A pickup coil is energized by the oscillating member to produce a feedback signal at the natural frequency of the oscillating member, and this feedback signal is connected to the solid-state elements to control the timing of magnetic pulses in the stator coils thereby synchronizing the rotor speed in step with the natural frequency of the mechanical oscillator.

3,617,842

RATE GYRO ELECTRICAL CONTROL AND INDICATOR SYSTEM

John Van Dyke, Byron Center, and Benard Lamfers, Jenison, both of Mich., assignors to R. C. Allen Business Machines Incorporated, Grand Rapids, Mich.

Filed Jan. 27, 1969, Ser. No. 794,018
Int. Cl. H02p *5/40*
U.S. Cl. 318—227 **6 Claims**



An electrical control and indicator system for a rate gyro of the kind comprising a synchronous AC spin motor and a pickoff device for developing two AC turn rate analog signals, comprising a motor start control circuit for switching a starting capacitor into and out of the motor circuit in response to changes in the stator voltages. The system further includes an inverter power supply with driver and switch circuits to energize the motor from a DC source without appreciable loading of the inverter. The demodulator of the system is a balanced differential rectifying amplifier comprising two cross-connected emitter follower stages each using a transistor as the load impedance for the emitter follower. The start control circuit, the inverter power supply, and the demodulator all comprise a single noninductive integrated silicon circuit.

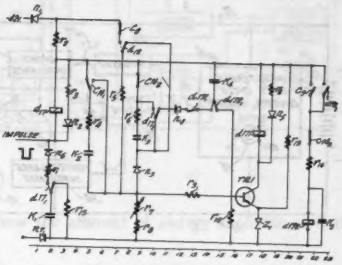
3,617,843

SLOW-MOTION CONTROL FOR PAPER-CUTTING MACHINES

Helmut Neumann, and Artur Guse, both of Hannover, Germany, assignors to H. Wohlenberg Kommanditgesellschaft, Hannover, Germany

Continuation-in-part of application Ser. No. 664,006, Aug. 29, 1967, now abandoned. This application Sept. 22, 1969, Ser. No. 859,979
Int. Cl. H02p *3/00*
U.S. Cl. 318—272 **2 Claims**

Resistor-capacitor timing control circuits are provided to start the back gauge of a guillotine type paper-cutting



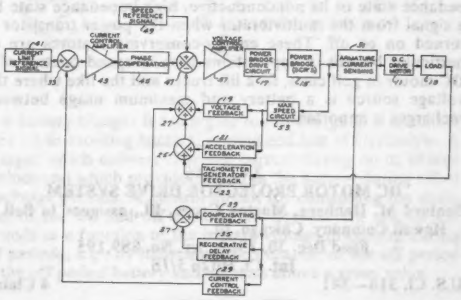
machine at fast speed following each cut unless a slow speed is specifically required.

3,617,844

CONTROLLED-VELOCITY DRIVE

James W. Grygera, Kenosha, Wis., assignor to Eaton Yale & Towne Inc., Cleveland, Ohio

Filed May 21, 1969, Ser. No. 826,629
Int. Cl. H02p *5/16*
U.S. Cl. 318—331 **8 Claims**

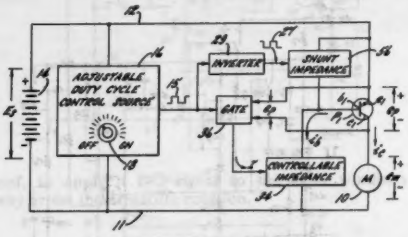


A DC controlled-velocity drive. An SCR power bridge is energized by a three-phase AC power source for supplying DC voltage to the armature of a DC drive motor when the SCR's are triggered, shifting of the phase of triggering causing variation of the DC voltage for varying the motor speed. Various regenerative and degenerative feedback circuits are employed, among them being a feedback circuit sensing this DC voltage and a feedback circuit sensing the motor armature current. These feedback circuits produce feedback signals which are compared with motor speed and armature current reference signals for the purpose of controlling the phase of triggering of the SCR's in order to maintain the motor speed substantially equal to a preselected motor speed while preventing the motor armature current from exceeding a predetermined maximum.

3,617,845
ENERGY-CONSERVING CONTROL CIRCUIT USING POWER TRANSISTORS

William F. McKenna, Rockford, Ill., assignor to Applied Motors, Inc., Rockford, Ill.

Filed Apr. 27, 1970, Ser. No. 32,269
Int. Cl. H02p 5/16
U.S. Cl. 318—341 16 Claims

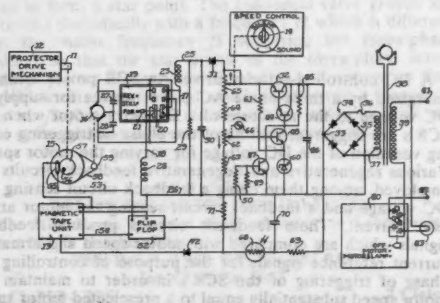


A control circuit for supplying pulses of current, with a variable duty cycle, from a voltage source through a load which may vary in its effective impedance and wherein a power transistor is in series with the load to turn the current on and off. The transistor is driven always to collector current saturation when it is turned on so that power loss in the transistor and excessive heating are substantially minimized. But when the effective load impedance is high, the base-emitter current required to saturate the transistor is considerably less than that required when the effective load impedance is low. To avoid energy dissipation and loss due to unnecessarily high emitter-base current, the base-emitter circuit includes a control transistor which acts as a controllable impedance, the control transistor receiving emitter-base current proportional to the voltage drop across the power transistor so that emitter-base current of the power transistor is always just sufficiently great to keep the power transistor saturated. The average current through the load, e.g., a DC motor, is varied by employing a multivibrator adjustable in its duty cycle to produce a control signal which alternately enables or disables the control transistor. And to avoid energy loss due to slow turnoff of the power transistor, the emitter-base junction of the power transistor is shunted by a transistor automatically switched to its conductive, low-impedance state or its nonconductive, high-impedance state by a signal from the multivibrator when the power transistor is turned on or off. These energy-conserving features are of particular benefit in applications such as speed control of a DC motor in golf carts, fork lift trucks and the like where the voltage source is a battery and maximum usage between recharges is important.

3,617,846
DC MOTOR PROJECTOR DRIVE SYSTEM

Sanford M. Hanberg, Morton Grove, Ill., assignor to Bell & Howell Company, Chicago, Ill.

Filed Dec. 30, 1969, Ser. No. 889,195
Int. Cl. H02p 5/16
U.S. Cl. 318—341 4 Claims

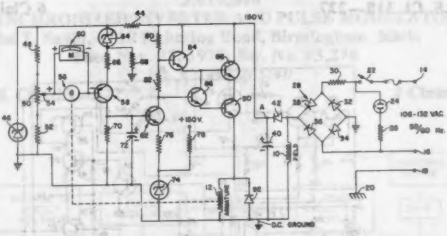


Drive system for operating a motion picture projector in synchronism with a sound reproducing unit in which a DC motor is connected to an unregulated DC voltage-supply source through a voltage-dropping device which is controlled through a first regulator circuit from a speed control signal and which is controlled through a second regulator circuit to regulate the maximum adjusted DC motor voltage. During silent operation, the first regulator circuit is inactive and the second regulator circuit is adjustable to adjust DC motor speed. During sound reproduction, the second regulator circuit is set at a relatively high voltage position (free run maximum speed). In both operations, the effect of changes in supply voltage and other variables is minimized to stabilize operation.

3,617,847
SPEED REGULATING ELECTRONIC CIRCUIT FOR DC MOTOR CONTROL

Frederick W. Powell, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation of application Ser. No. 730,442, May 20, 1968, now abandoned. This application Feb. 24, 1970, Ser. No. 14,745
Int. Cl. H02p 5/16
U.S. Cl. 318—345 1 Claim



This invention relates to a speed regulating electronic circuit for a DC motor. A tachometer generator, driven by the armature shaft of the DC motor, provides a voltage signal which is a function of the instantaneous speed of the motor. The tachometer generator output voltage is combined with a reference voltage which is a function of the desired speed, and the difference is applied to a plurality of amplifiers in cascade to develop a DC potential level which is applied across *n* equal resistors connected in series to provide *n* voltage drops, where *n* is an integer selected from the series 2,3,4,.....*n*. These *n* voltage drops are applied to a first set of *n* transistor amplifiers connected in cascade, and the *n* outputs which they provide are applied to a second set of *n* transistors connected in cascade and in series with the motor armature. This arrangement insures that each transistor of the second set of *n* transistors will dissipate equal power, regardless of armature load current demand, with concomitant advantages in increased efficiency and lower costs.

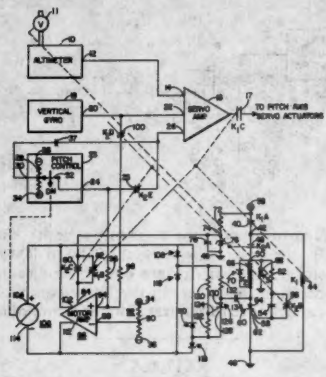
3,617,848
SYNCHRONIZATION AND ATTITUDE COMMAND NULLING APPARATUS

Robert E. Friday; Clyde M. Kobe, and James W. Locker, all of, Minneapolis, Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 10, 1968, Ser. No. 758,752
Int. Cl. G05b 7/00; B64c 13/18
U.S. Cl. 318—584 3 Claims

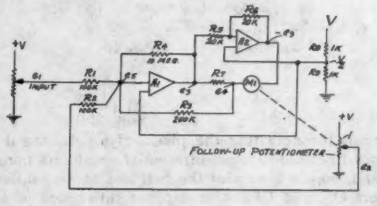
A pitch axis flight control having a single motor to provide preengagement synchronization of the pitch axis manual controller and automatic nulling of the control after a control mode change from an attitude hold mode to an altitude hold mode. Preengagement synchronization is provided by electrically summing outputs of a vertical gyro and the manual controller, and using the summed signal to control an amplifier and motor combination, which drives the manual controller to a position such that the vertical gyro output signal is nullified by the manual controller output. Upon switching of the system from an attitude hold mode to an altitude hold mode, a switching relay actuates an altitude error device whose

signal is combined with the vertical gyro signal and the pitch controller signal to derive a control error signal. To insure levelling off of the craft in altitude hold, a switching relay disconnects the vertical gyro signal from the amplifier and



motor combination, thereby causing the pitch control potentiometer to be driven to a null output. Apparatus for automatically switching the flight control from an altitude to an attitude hold mode upon repositioning the pitch control potentiometer is also disclosed.

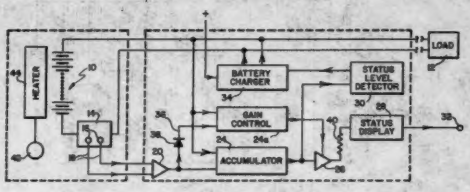
3,617,849
MOTOR CONTROL DAMPING CIRCUIT
Robert L. Charlton, Earlysville, Va., assignor to Teledyne, Inc., Los Angeles, Calif.
Filed Aug. 14, 1970, Ser. No. 64,543
Int. Cl. G05b *5/01*
U.S. Cl. 318—616 **6 Claims**



The circuit controlling the motor which actuates a control potentiometer or the like is made up of operational amplifiers and resistors connected so that, at stall, the feedback loop is not effective and the feedback loop is effective only when the motor is turning, which provides the desired rate feedback for servo damping.

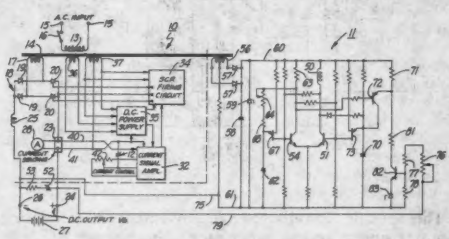
3,617,850
BATTERY-STATUS DEVICE
Ernest H. Domshy, Downey, Calif., assignor to North American Rockwell Corporation
Filed Dec. 9, 1968, Ser. No. 782,199
Int. Cl. H02j *7/00*
U.S. Cl. 320—31 **10 Claims**

This disclosure is directed to a battery and a battery-status device that indicates at all times the energy available from a battery. The arrangement is such that it takes into consideration: the energy drawn from the battery, the energy that is pumped back into the battery, the past history of the battery (whether it has been on standby duty or has been in a constant charge/discharge usage), the age of the battery, and the temperature of the battery—the temperature measurement being useful for two purposes—namely; to heat the battery to its proper operating temperature, and to vary the status-indi-



cation to show the amount of energy available at that temperature.

3,617,851
BATTERY CHARGER WITH CONTROL CIRCUIT FOR CYCLICAL CHARGE AND DISCHARGE AS A FUNCTION OF BATTERY VOLTAGE DURING DISCHARGE
Glen O. Du Puy, and Mark Schindler, both of Los Angeles, Calif., assignors to Christie Electric Corp., Los Angeles, Calif.
Filed Sept. 29, 1969, Ser. No. 861,569
Int. Cl. H02j *7/10*
U.S. Cl. 320—22 **13 Claims**

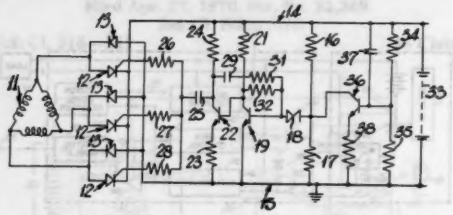


A battery charger for charging to full charge in a minimum time while avoiding heating, gassing and loss of electrolyte. A charger which delivers charging current during on or charge periods and which provides a load to the battery during off or discharge periods. A control circuit for controlling the duration of the on and off periods and for varying one of the periods as a function of the battery voltage prevailing during off periods, e.g., by increasing the duration of the off period as the off period battery voltage rises above a given value.

3,617,852
BATTERY CHARGING SYSTEM WITH A PERMANENT MAGNET ALTERNATOR AND MEANS FOR MINIMIZING NOISE
Lancelot Phoenix, Birmingham, England, assignor to Joseph Lucas (Industries) Limited, Birmingham, England
Filed Sept. 10, 1968, Ser. No. 758,859
Claims priority, application Great Britain, Sept. 11, 1967, 41299/67
Int. Cl. H02j *7/14*
U.S. Cl. 320—61 **2 Claims**

In a battery charging system the battery is connected between a pair of supply lines and is charged by a permanent magnet alternator through a combined full-wave rectifier and regulating circuit, including thyristors which are controlled to control the supply from the alternator to the battery. A voltage regulator controls the gate currents of the thyristors, and there is further provided a control circuit connected across

the supply lines and providing to the regulator an input signal which when the regulator changes state ensures that the



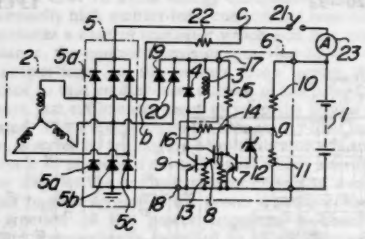
regulator operates to change the gate current only after a delay.

3,617,853

BATTERY VOLTAGE REGULATING SYSTEM USING A TRANSISTOR SWITCHING CIRCUIT

Yohichi Kawashima, Gifu-shi, and Hisami Mitsueda, Mie-gun, both of Japan, assignors to Nippon Denso Kabushiki Kaisha, Kariya-shi, Japan

Filed July 15, 1969, Ser. No. 841,917
Claims priority, application Japan, Sept. 26, 1968, 43/69673
Int. Cl. H02j 7/14
U.S. Cl. 320—61 6 Claims



This specification discloses improvements in or relating to a power source system comprising a three-phase AC generator, a three-phase full-wave rectifier for rectifying the output from the three-phase AC generator, a battery connected with the output terminal of the three-phase AC generator, and a voltage regulating system for controlling the excitation of the generator so as to maintain the terminal voltage of the battery at a predetermined value. The improvements particularly relate to the voltage regulating system, and lie in that a transistor switching circuit is provided with feedback to cause a switching hysteresis for minimizing high-frequency switching noise while the source voltage of the transistor voltage regulating system which has hitherto been derived from a three-phase full-wave rectifier circuit, is derived from a two-phase full-wave rectifier circuit, to provide a periodic off-time for preventing undue battery voltage deviations that might otherwise be caused by such switching hyteresis and in order to economize the number and size of components to be used, and to improve the regulating characteristic as well as to facilitate the compact construction of the entire system.

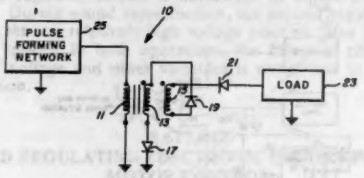
3,617,854

PULSE TRANSFORMER

Benjamin R. Cole, Arlington, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Apr. 20, 1970, Ser. No. 29,813
Int. Cl. H02m 7/00
U.S. Cl. 321—15 3 Claims

An electromagnetic transformer of special design which, when operated with associated circuitry, exhibits, during at least one portion of each cycle of operation, a lower interwinding capacitance than known transformers of comparable design. The secondary winding, or windings, of the disclosed transformer consist of a plurality of single layer segments, successive ones of such segments being joined through a diode in such a manner that, when a signal of a given polarity is applied to the primary winding of the transformer, the



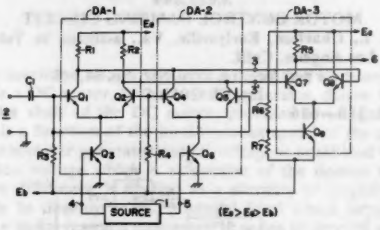
diodes conduct to connect the segments in series and when a signal of opposite polarity is applied to the primary winding of the transformer the diodes are cut off to disconnect the segments one from the other. In the latter condition the interwinding capacitance of the transformer is a minimum.

3,617,855

PHASE-DETECTING CIRCUITS

Chosaku Hisatsu, Chigasaki, Japan, assignor to Nippon Oceanics Institute, Ltd., Katase, Fujisawa, Japan

Filed Sept. 23, 1970, Ser. No. 74,809
Claims priority, application Japan, Apr. 24, 1970, 45/34930
Int. Cl. H02m 5/00; H03f 21/00
U.S. Cl. 321—51 2 Claims



A circuit for detecting the phase of an AC input signal comprises first and second differential amplifiers connected in parallel, means to render the first and second differential amplifiers ON and OFF with a phase difference of 180° in response to the AC input signal, and a third differential amplifier which compares outputs from the first and second differential amplifiers to provide a DC output having a polarity related to the phase of the AC input signal.

3,617,856

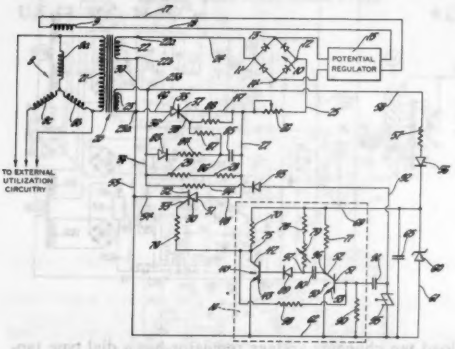
ALTERNATOR UNDER-FREQUENCY DETECTING CIRCUIT

Richard N. Lehnhoff, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 18, 1970, Ser. No. 90,623
Int. Cl. H02p 9/26, 9/42
U.S. Cl. 322—24 5 Claims

An alternator under-frequency detecting circuit for reducing the alternator output potential with conditions of less than normal output potential frequency. A source of each an alternating current sensing potential and an alternating current auxiliary sensing potential are connected in series aiding relationship across the alternating current input circuitry of a sensing potential rectifier circuit and a pair of silicon-controlled rectifiers are connected in an opposite polarity relationship across the source of alternating current auxiliary sensing potential. A trigger signal, produced at the beginning of each selected half-cycle of the alternating current auxiliary sensing potential for a predetermined duration of time

greater than the normal frequency period of the selected half-cycles is applied across the gate-cathode electrodes of one of the silicon-controlled rectifiers. With normal alternator output potential frequency, the silicon-controlled rectifiers are triggered conductive to effectively shunt the auxiliary sensing potential from the rectifier circuit and the alternator-rectifier system functions normally. With less than



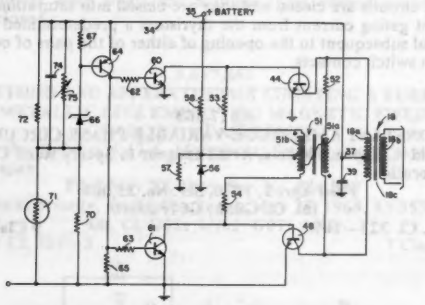
normal alternator output potential frequency, the silicon-controlled rectifiers are not triggered conductive, consequently, the sensing and auxiliary sensing potentials are applied across the rectifier circuit in a series aiding relationship, are rectified thereby and sensed by a potential regulator circuit which decreases the alternator field excitation and output potential magnitude.

3,617,857

VOLTAGE REGULATOR FOR BRUSHLESS ALTERNATOR

Philip D. Gunderson, Prospect Heights, Ill., assignor to Motorola, Inc., Franklin Park, Ill.

Filed May 26, 1970, Ser. No. 40,589
Int. Cl. H02p 9/30
U.S. Cl. 322—28 **5 Claims**



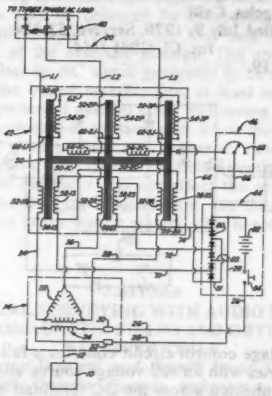
A voltage regulator for brushless alternators including an oscillator circuit which has the output thereof fed into a stationary, primary winding of a rotary transformer device which, in turn, has a secondary winding thereof rotatable with the rotor shaft of the alternator. The oscillator is a free running oscillator at substantially a fixed frequency and the output of the alternator is fed back to a voltage sensor circuit which, in turn controls the oscillator between fully on and fully off conditions to regulate the output therefrom to the primary winding of the rotary transformer thereby regulating the power output of the alternator.

3,617,858

EXCITATION OF ALTERNATING CURRENT MACHINERY

Edward G. Oder, Jr., Sulphur Springs, Tex., assignor to Warren Petroleum Corporation, Tulsa, Okla.

Filed July 7, 1969, Ser. No. 839,307
Int. Cl. H02p 9/32
U.S. Cl. 322—76 **10 Claims**



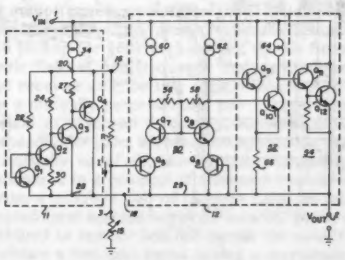
An excitation and control system for heavy-duty electricity generating machines wherein a single-transformer and rectifying means is provided to serve all control purposes. The transformer is provided with an arm for each phase which carries a control coil tapped into the rectifying means. By manually adjusting a rheostat, saturation of the transformer core between the primary and secondary coils is controlled to finely control output voltage. The entire system has no moving parts and may be sealed.

3,617,859

ELECTRICAL REGULATOR APPARATUS INCLUDING A ZERO TEMPERATURE COEFFICIENT VOLTAGE REFERENCE CIRCUIT

Robert C. Dobkin, Menlo Park, and Robert J. Widlar, Mountain View, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Mar. 23, 1970, Ser. No. 21,968
Int. Cl. G05f 1/58
U.S. Cl. 323—4 **12 Claims**



An integrated circuit regulator including a temperature stable constant voltage reference wherein the negative temperature coefficient of the base-to-emitter voltage a first transistor in conjunction with the positive temperature coefficient of the base-to-emitter voltage differential between two additional transistors operating at different current densities is used to achieve a zero temperature coefficient reference potential. The constant voltage reference is combined with a voltage follower and provides a source of constant current which is passed through an external variable resistance to develop a selectable and predictable adjustment voltage for

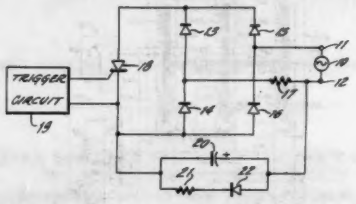
driving the voltage follower so as to cause an unregulated input voltage applied thereto to be regulated at an output terminal.

3,617,860

THYRISTOR VOLTAGE CONTROL CIRCUIT WITH COMMUTATING CAPACITOR

Richard J. Williams, Carson, and Paul Pavljuk, Los Angeles, both of Calif., assignors to International Rectifier Corporation, Los Angeles, Calif.

Filed July 9, 1970, Ser. No. 53,424
Int. Cl. G05f 1/44
U.S. Cl. 323—19 **7 Claims**



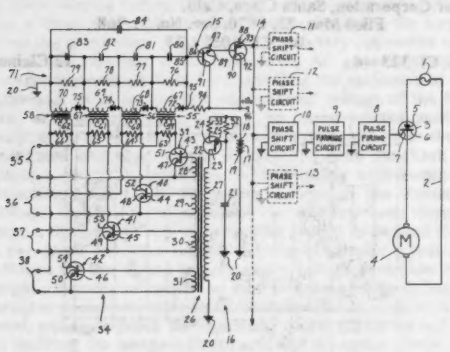
An AC voltage control circuit contains a full-wave bridge rectifier in series with an AC voltage source and load, and a thyristor is connected across the DC terminals of the bridge. A commutating circuit including a capacitor in parallel with a series connected diode and discharge resistor is connected between the source terminal end of the load and a terminal of the thyristor and extends the available turnoff time of the thyristor.

3,617,861

CIRCUIT FOR SUMMING ELECTRICALLY ISOLATED SIGNALS

David E. Ford, Jr., Milwaukee, and Richard W. Waltz, New Berlin, both of Wis., assignors to Allen-Bradley Company, Milwaukee, Wis.

Filed Feb. 6, 1970, Ser. No. 9,216
Int. Cl. H02p 13/16; H02m 5/28
U.S. Cl. 323—33 **6 Claims**



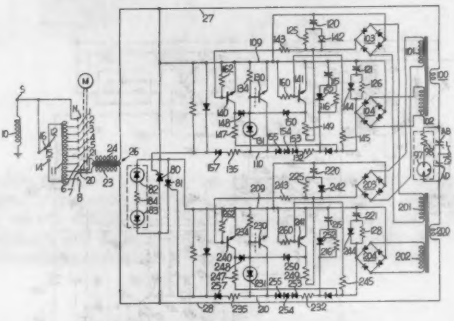
A control circuit for an SCR that is capable of responding to a plurality of electrically isolated input signals has a summing circuit connected to its input terminals to sum functions of the input signals. The summed signals are phase synchronized with formed SCR in a Phase Shift Circuit. The synchronized signal is formed into pulse trains functional of the summed input signals. The pulse trains are shaped in a pulse firing signal, which is connected to the SCR gate. The summing circuit chops the DC input signals with a reference carrier and sums the resulting envelopes in the secondaries of output coupling transformers.

3,617,862

ARCLESS LOAD TAP CHANGING APPARATUS

Frederick A. Stich, Milwaukee, Wis., assignor to Allis-Chalmers Manufacturing Company, Milwaukee, Wis.

Filed Dec. 31, 1969, Ser. No. 889,639
Int. Cl. H02p 13/06; G05f 1/14
U.S. Cl. 323—43.5 S **29 Claims**



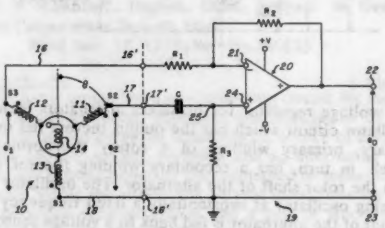
A load tap changing voltage regulator has a dial type tap-changing switch and an odd-even switch integral therewith having first and second pairs of contacts connected in series with first and second rotatable tap changer contacts forming first and second load circuits, and the odd-even switch contacts open before the corresponding tap changer rotatable contact disengages a stationary contact and close after it engages a succeeding stationary contact. A pair of oppositely poled thyristors are connected across the first and second load circuits. First and second current transformers are connected in the first and second load circuits and energize bridge rectifiers which supply gating current to the thyristors and also indicate whether the load circuits are open or closed. RC time delay circuits responsive to the opening of either load circuit remove the gating signals to the thyristors after a predetermined time delay, thus assuring that the tap changer switch contacts and the odd-even switch contacts do not interrupt current and that the current is commutated off by the thyristors at current zero. Shunt regulators between the bridge rectifiers and the cathode-gate circuits of the thyristors regulate the power dissipation of the gate circuits, and the shunt control elements are biased in the active region to permit gating current to flow to the thyristors when both load circuits are closed and they are biased into saturation to shunt gating current from the thyristors a predetermined interval subsequent to the opening of either of the pairs of odd-even switch contacts.

3,617,863

CONSTANT AMPLITUDE-VARIABLE PHASE CIRCUIT

David A. Espen, Phoenix, Ariz., assignor to Sperry Rand Corporation

Filed Apr. 2, 1970, Ser. No. 25,004
Int. Cl. G05f ; G01r 25/10
U.S. Cl. 323—109 **9 Claims**



An electronic circuit including an operational amplifier having a differential input stage coupled to passive linear

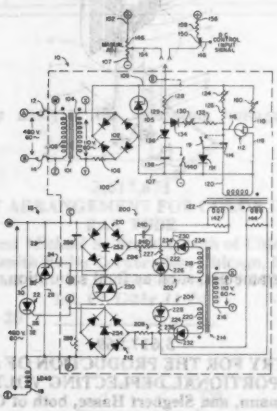
input and feedback circuit components for converting three wire synchro-type data to an equivalent constant amplitude-variable phase signal.

3,617,864

SOLID-STATE PHASE CONTROL PANEL

David J. Senger, 406 S. Hester, Stillwater, Okla.

Filed May 18, 1970, Ser. No. 38,415
Int. Cl. G05f *1/40*; H03k *17/00*
U.S. Cl. 323—22 SC 9 Claims



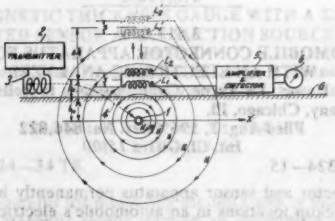
An air-cooled phase control panel, including two controlled rectifiers, is designed to supply regulated amounts of power to a heavy industrial load such as a resistance welding unit. A trigger delay capacitor limits the power initially supplied to the load and protects the controlled rectifiers from starting transient currents. This trigger delay capacitor makes it possible to use high-speed overcurrent circuit breakers in series with the controlled rectifiers. A voltage breakdown device connected between the trigger terminals of the rectifiers protects the rectifiers from voltage transients. A trigger pulse amplifying and peaking circuit insures that the controlled rectifiers are rendered fully conductive in the minimum possible time and thus prevents any localized thermal destruction from occurring within the controlled rectifiers. Both single and multiple-phase embodiments are disclosed.

3,617,865

METHOD AND APPARATUS FOR LOCATING A BURIED METALLIC LINE EMPLOYING MAGNETIC FIELD GRADIENT MEASUREMENTS

Goroku Hakata, 6-17-4, Matsubara, Setagaya-ku, Tokyo-to, Japan

Filed May 22, 1969, Ser. No. 826,898
Claims priority, application Japan, May 25, 1968, 43/35328
Int. Cl. G01r *33/02*; G01v *3/00*
U.S. Cl. 324—3 7 Claims



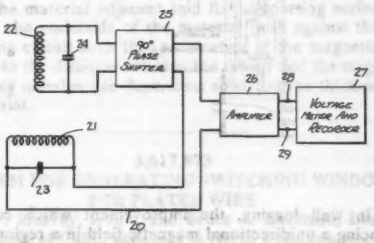
A method and apparatus for locating a buried metallic line such as, for instance, a power line, telephone cable, water pipe, gas pipe, etc. without digging. An AC current is placed through the buried metallic line by direct connection or electromagnetic induction at a frequency of, for example, 100 kc., and the gradient of the magnetic field generated by the AC current is measured on a first and a second level above the ground surface. The lateral position on the ground surface where the metallic line is buried, is determined by the maximum reading of the magnetic field gradient when it is measured along the first level, while the depth of the buried metallic line may be obtained by comparing the magnetic field gradients measured on the first and second levels, respectively, at the detected position. The apparatus essentially comprises an AC signal generator to be connnected or coupled to the buried metallic line, at least one pair of differentially connected parallel coils, and means for measuring the voltage inducted in the coil pair. Since the field gradient is measured rather than the magnetic field, itself, any uniform magnetic field such as the field directly generated by the AC signal generator will not affect the positional information derived from the measurement, and thus the accuracy of the location of the buried metallic line is not adversely affected.

3,617,866

GEOPHYSICAL SURVEYING WITH AUDIO FREQUENCY ELECTROMAGNETIC FIELDS AND ORTHOGONAL RECEIVER COILS

John Shillington Dowsett, and Russell David Leask, both of Copper Cliff, Ontario, Canada, assignors to The International Company, Inc., New York, N.Y.

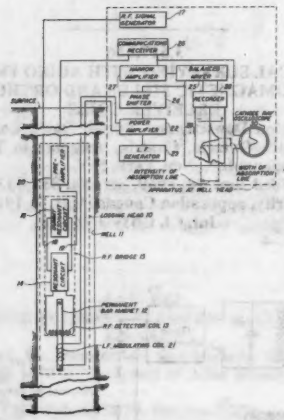
Filed June 10, 1969, Ser. No. 831,833
Claims priority, application Canada, Mar. 7, 1969, 045045
Int. Cl. G01v *3/16*
U.S. Cl. 324—4 16 Claims



Method and apparatus for conducting electromagnetic geophysical surveys, including airborne electromagnetic surveys, to explore for electrically conductive ore bodies while radiating audiofrequency electromagnetic fields over the terrain being surveyed. Two mutually perpendicular receiver coils each pickup (or generate) electric signals from an electromagnetic field at one frequency and, advantageously, an additional receiver coil, or two additional receiver coils arranged as a mutually perpendicular pair, pickup signals from another field at a second frequency. Receiver coils in mutually perpendicular pairs are electromagnetically matched to provide mutually equal electromagnetic pickup capabilities and are disposed in a position of minimum mutual coupling. Signals from a matched pair of receiver coils are maintained in undistorted form and are subjected to a 90° phase shift and then combined to sum or add the signals vectorially to each other to obtain a resultant signal having a magnitude responsive to both the magnitude and the phase of secondary, possibly phase-shifted, fields when received with the primary field over terrain being surveyed and provide high discrimination of desired anomalous electromagnetic effect signals, such as occur above electrically conductive ore bodies, from undesired noise signals such as maneuver noise. Summing the receiver coil signals after 90° phase shift is introduced functions to suppress maneuver noise otherwise tending to arise during rotational variation of the orientation of a search coil in the transmitted field and also serves to enhance desired anomalous electromagnetic effects. In certain advantageous embodiments, additional signals are picked up at a second frequency, the magnitudes of signals

received at the two frequencies are electrically compared and a resultant difference signal responsive to magnitude and phase effects of secondary fields, when present, is produced and provides especially high discrimination of desired anomalous effect signals over noise signals.

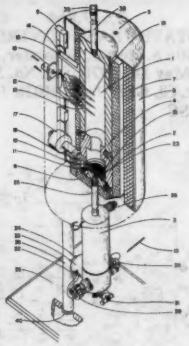
3,617,867
METHOD AND APPARATUS FOR WELL LOGGING UTILIZING RESONANCE
Gerherd Herzog, Houston, Tex., assignor to Texaco Inc.
Continuation-in-part of application Ser. No. 238,754, July 26, 1951, now abandoned. This application July 17, 1953, Ser. No. 368,547
Int. Cl. G01n *27/78*
U.S. Cl. 324—0.5 **69 Claims**



1. In well logging, the improvement which comprises producing a unidirectional magnetic field in a region including earth adjacent the well, simultaneously producing in the same region an alternating magnetic field having a component of its vector transverse to that of the unidirectional magnetic field, the alternating magnetic field being tuned to the resonance frequency for nuclei of atoms present in a substance contained in the region, and detecting the resulting input of energy from the alternating magnetic field to the nuclei.

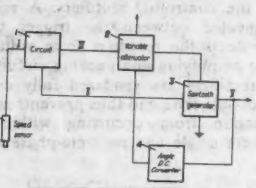
3,617,868
RESISTIVITY CELL INCLUDING A GROUNDED SHIELD FOR LIQUID-SOLID MIXTURES
James E. Beitel, Englewood, Colo; Eugene Allen Breitenbach, and Charles R. Bruce, Colo. Assignor to Marathon Oil Company, Findlay, Ohio
Filed June 9, 1969, Ser. No. 831,676
Int. Cl. G01n *27/04*
U.S. Cl. 324—13 **11 Claims**

The resistivity of drilling fluid components, e.g. mud solution, mud cake, and mud filtrate water, are determined using a pressurized and heat controlled cylindrical cell to simulate bore hole conditions. The cell has an upper mud receiving portion separated from a lower mud filtrate receiving portion by a porous partition upon which mud cake deposits. Three sets of electrodes, preferably the four electrode type, extend into each of the mud, mud cake, and mud filtrate receiving portions, so that upon application of current, across the two outer electrodes in each of the three systems and upon taking a voltage reading across the two inner electrodes of each of the three systems, the resistivity of the mud, mud cake, and mud filtrate, may be determined. Knowledge of these resistivity values is helpful in further determining subterranean



formation parameters, such as fluid saturation, porosity, and permeability.

3,617,869
CIRCUITRY FOR THE PRODUCTION OF A SPEED-PROPORTIONAL DEFLECTING VOLTAGE
Reimar Germann, and Siegbert Haase, both of Graz, Austria, assignors to Hans List, Graz, Austria
Filed May 14, 1969, Ser. No. 824,643
Claims priority, application Austria, Apr. 18, 1969, A 3802/69
Int. Cl. G01m *15/00*
U.S. Cl. 324—15 **1 Claim**

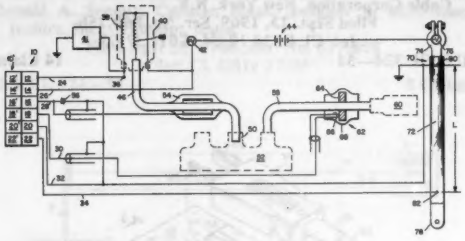


A circuit for the generation of a deflecting voltage for the time-base deflection of an oscilloscope, which deflection is proportional to the speed of an engine and including a sawtooth generator controlled by the input pulses of a speed sensor on the engine. A variable attenuator regulates the slope of the sawtooth generator deflecting voltage so as to vary the frequency of the sawtooth voltage in accordance with the repetition rate of the engine ignition signals.

3,617,870
AUTOMOBILE CONNECTOR APPARATUS FOR USE WITH AN ELECTRONIC ANALYZER
Peter A. Howes, La Verne, Calif., assignor to Bell & Howell Company, Chicago, Ill.
Filed Aug. 1, 1969, Ser. No. 846,822
Int. Cl. G01m *15/00*
U.S. Cl. 324—15 **9 Claims**

Connector and sensor apparatus permanently installed at probe pickup locations in an automobile's electrical system, for connection to an electronic analyzer. A current probe included by the apparatus involves the determination of a length of a battery ground cable relating voltage difference

across the determined length to current passing through the cable in a calibrated manner, and connecting the determined



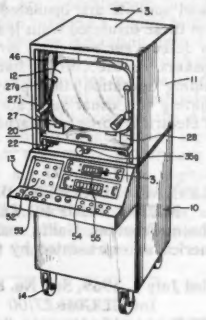
length to the analyzer for measuring voltage difference thereacross.

3,617,871

FINAL TEST ARRANGEMENT FOR COLOR CATHODE-RAY TUBE

Emil Rogus, and Michael S. Tamkin, both of Chicago, Ill., assignors to Zenith Radio Corporation, Chicago, Ill.

Filed Nov. 24, 1969, Ser. No. 879,012
Int. Cl. G01r *31/24*
U.S. Cl. 324—20 **16 Claims**



A test cart has an upper compartment into which a shadow mask color tube is loaded, being received in a movable workholder with the tube axis aligned with a horizontal reference axis. The workholder carries the tube into proper operating relation with respect to the usual accessories such as deflection yoke, convergence assembly, blue lateral, purity coil and tube socket. Various electrical systems are housed in the lower compartment of the cart, supplying energizing potentials and electrical signals necessary to test the tube in an environment closely simulating that of a color television receiver. A digital voltmeter is controlled by a function switching deck for convenient measurement of the operating characteristics of the tube under test.

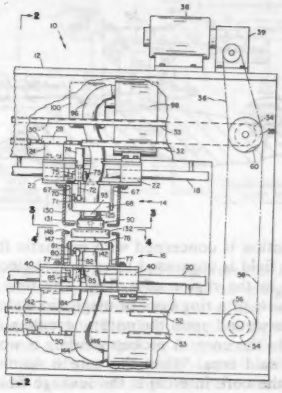
3,617,872

MAGNETIC THICKNESS GAUGE WITH A GAS-SUPPORTED SENSOR AND A SUCTION SOURCE IN THE BASE

John J. Horn, East Greenwich, and George E. Corneau, Central Falls, both of R.I., assignors to Indev, Inc., Pawtucket, R.I.

Filed Oct. 6, 1969, Ser. No. 864,130
Int. Cl. G01r *33/12*
U.S. Cl. 324—34 TK **8 Claims**

In an apparatus for measuring the thickness of material including a magnetic sensor forming an incomplete magnetic circuit, a gas source, structure defining a gas-confining chamber in communication with said gas source providing a gas cushion on the top surface of said material for supporting the sensor a fixed distance above the top surface of said material, and readout means for producing a signal dependent on relative vertical sensor movement, the improvement comprising material support structure including a supporting member formed of magnetic material to complete a magnetic circuit with the sensor, and providing a flat supporting surface located opposite the sensor and contacting the underside of the material, a suction source, and structure providing



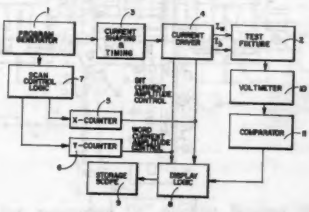
communication between the suction source and the underside of the material adjacent said flat supporting surface to maintain the underside of the material flush against the flat supporting circuit such that parameters of the magnetic circuit due to the distance between the sensor and the magnetic supporting member are dependent solely on the thickness of the material.

3,617,873

SYSTEM FOR GENERATING SWITCHING WINDOW FOR PLATED WIRE

Glenn W. Murray, Irvine, and Bruce A. Kaufman, Los Angeles, both of Calif., assignors to North American Rockwell Corporation

Filed Dec. 22, 1969, Ser. No. 887,153
Int. Cl. G01r *33/00*
U.S. Cl. 324—34 R **3 Claims**



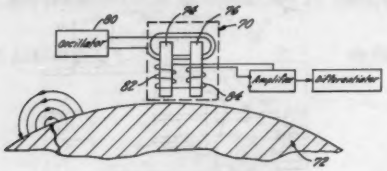
Counters are used to sweep word and bit currents for a plated wire sample in a synchronous incremental manner over a matrix in an X-Y plane. The output from the plated wire at each X-Y coordinate is compared with a reference voltage. If the output voltage is less than the reference voltage, a dot is generated on a display oscilloscope. If the voltage is in excess of the reference voltages, the dot is blanked out. The sweeping continues until the wire has been tested for all values of word and bit current. The switching window display (area of blanked dots) on the oscilloscope is thereby generated automatically.

3,617,874

MAGNETIC LEAKAGE FIELD FLAW DETECTOR UTILIZING TWO RING CORE SENSORS

Friedrick M. O. Forster, Der Schoene Weg 144, 741 Reutlingen, Germany

Continuation of application Ser. No. 661,458, Aug. 17, 1967. This application Apr. 13, 1970, Ser. No. 28,172
Int. Cl. G01r 33/12
U.S. Cl. 324—37 3 Claims



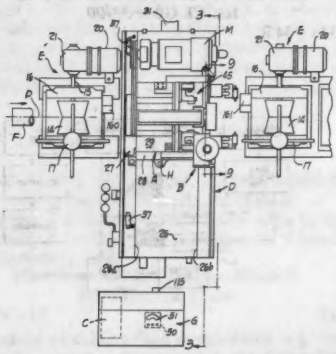
This invention is concerned with magnetic flaw detection. A magnetic field is impressed upon a workpiece, which field is distorted in the region of a flaw. The flaw detector employed consists of a ring core of magnetic material. An energizing coil is wound upon the core to create a magnetic field totally within the core. A pickup winding is wound diametrically about said core. When the core is scanned across the workpiece the core intercepts the leakage field of the flaw. The interaction of the leakage field and the energized field in the core create an output signed on the pickup winding. Two cores can be used together to yield a signal indicative of the gradient of the stray field.

3,617,875

METHOD AND APPARATUS FOR DETECTING DEFECTS IN ARTICLES AND FOR MARKING THE LOCATIONS OF DEFECTS DETECTED IN THE ARTICLES

Joseph M. Mandula, Seven Hills, and John B. Fox, Shaker Heights, both of Ohio, assignors to Republic Steel Corporation, Cleveland, Ohio

Filed Jan. 24, 1969, Ser. No. 793,652
Int. Cl. G01r 33/12
U.S. Cl. 324—37 17 Claims



Apparatus for electrically detecting and marking defects in metal articles includes inspection devices for orbiting about a moving article to detect flaws in the article, a logic unit associated with the inspection devices for processing inspection information provided by the devices, and a marker unit operated by output signals from the logic unit to mark the locations of the flaws.

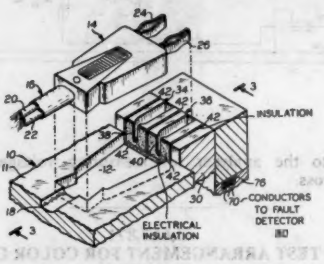
The disclosed apparatus also includes a calibration device for quick and simple calibration of the inspection devices.

3,617,876

MOLD ELECTRICAL TESTER FOR MOLDED CORDS

Daniel E. Robinson, Metuchen, N.J., assignor to General Cable Corporation, New York, N.Y.

Filed Sept. 23, 1969, Ser. No. 860,258
Int. Cl. B22d 19/04; G01r 31/02
U.S. Cl. 324—51 14 Claims



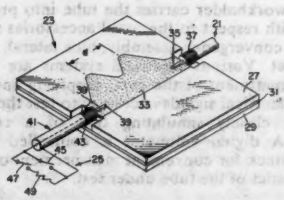
This mold for the terminations of electrical cords and harnesses has electrically conductive walls of the mold insulated from electrically conductive walls of holders for prongs or sockets of the mold termination; and the holders for the different prongs and sockets are insulated from one another. Conductors from these insulated walls lead to a fault detector which indicates defects such as open circuits, short circuits, crosses or "whiskers" in the cord or harness at the completion of the molding operation, thus providing an automatic test and eliminating the usual separate testing step in the manufacture of electrical cords and harnesses.

3,617,877

COAXIAL LINE MEASUREMENT DEVICE HAVING METAL STRIP FILTER

Charles A. Hobson, Fremont, Calif., assignor to The United States of America as represented by the Secretary of the Navy

Filed July 1, 1969, Ser. No. 838,166
Int. Cl. G01r 27/00
U.S. Cl. 324—57 R 6 Claims

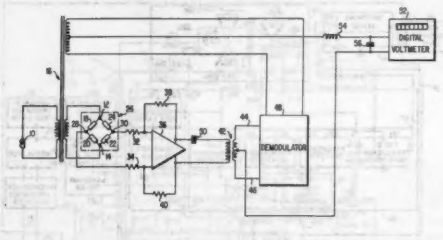


A coaxial line measurement device having a step function generator connected to the input of a coaxial line to be tested. The output of the coaxial line is connected to a sinusoid impedance anomoly device having a metal strip that has a physical configuration corresponding to the signal to be filtered. The step function signal is filtered and then the filtered signal is reflected back through the coaxial line and is compared to a signal from the step function generator that has been filtered and reflected by the sinusoid impedance anomoly device when the coaxial line is removed. The difference in the compared signals indicates the attenuation by the coaxial line under test. The device may be also used to measure the characteristics of antennas.

3,617,878
AC TO DC HIGH-ACCURACY LOW-LEVEL VOLTAGE MEASURING SYSTEM

Donald A. Senour, Carlisle, Mass., assignor to BLH Electronics, Inc., Waltham, Mass.

Filed Apr. 21, 1969, Ser. No. 817,809
Int. Cl. G01r *27/00*
U.S. Cl. 324—57 **5 Claims**

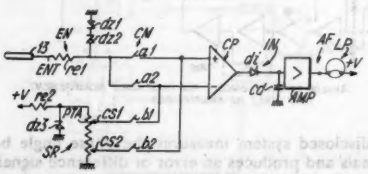


An AC to DC system is provided for measuring with high accuracy the low-level output voltage signals from an AC—excited Wheatstone—bridge-type circuit arrangement including electrical strain-responsive elements in its arms. In such a circuit arrangement, output voltages from the initially balanced bridge will be caused by a change in impedance of the strain-responsive elements due to external influences which are to be measured. The output signals from the bridge circuit arrangement are operationally amplified, demodulated to DC, and then read by a digital indicator, such as a digital voltmeter, to give an indication proportional to the to-be-measured influences upon the electrical strain responsive elements. A second demodulator may be used to compensate for system lead resistance and any demodulator inaccuracy, by using the output thereof to control the AC excitation applied to the bridge circuit arrangement input. The second demodulator output may also be directly applied as a reference input for a ratiometer-type digital indication. In one particular application, the strain-responsive elements are mounted as part of a load cell or transducer, and, when loads are applied to the same, the system output indications will be accurately related to the applied load.

3,617,879
APPARATUS FOR AUTOMATICALLY INDICATING WHETHER OR NOT A TEST JOINT IN A CIRCUIT IS ABOVE OR BELOW A PREDETERMINED REFERENCE POTENTIAL

Robert E. F. Mugnier, Annecy (Haute-Savoie), France, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Sept. 22, 1969, Ser. No. 859,998
Int. Cl. G01n *27/00*
U.S. Cl. 324—57 R **1 Claim**

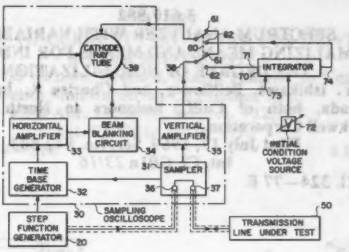


A testing method including the step of applying a rectangular wave to a logic circuit under test. Different points in the circuit under test are then probed and a signal lamp lights if the test point potential is sufficiently high or sufficiently low. The test point potential is compared with a reference. Duplicate indicators may be used to test for both high and low practically at the same time and without any operating switch. Alternatively, a double-pole, double-throw switch may be used with one indicator to test for either high or low. However, one or the other but not both low and high may be tested for in a single position of the switch.

3,617,880
TIME DOMAIN REFLECTOMETER

George D. Cormack, and Ronald P. Manning, Ottawa, Ontario, Canada, assignors to Northern Electric Company, Limited, Montreal, Quebec, Canada

Filed May 15, 1970, Ser. No. 37,724
Int. Cl. G01r *27/06*
U.S. Cl. 324—57 **4 Claims**

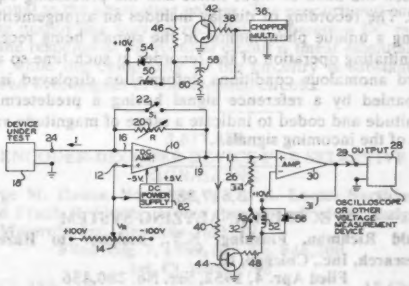


A typical sampling time domain reflectometer (T.D.R.) apparatus is modified by the addition of an integrator which can be selectively switched into and out of the vertical signal path. The integrator is utilized to integrate signals reflected from any reactive discontinuity in a transmission line under test. The amplitude of the integrated signal is utilized to enable the accurate determination of the reflection coefficient. The derived results are substantially unaffected by variations in the rise time of the step function signal. In addition, the apparatus' independence from the step function signal rise time enables the use of a longer rise time and thus the system's bandwidth requirement is lessened to the point where a real time T.D.R. apparatus may be utilized.

3,617,881
DC VOLTAGE-TESTING AND CURRENT-MEASURING CIRCUIT INCLUDING DIFFERENTIAL AMPLIFIER

John J. McCormick, Beaverton, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Nov. 24, 1969, Ser. No. 879,393
Int. Cl. G01n *27/00*
U.S. Cl. 324—57 R **11 Claims**



A circuit for measuring DC current flowing through a device under test at a known applied DC reference voltage is described in which a high-gain DC coupled differential amplifier is employed with a positive input connected to an adjustable source of such reference voltage and a negative input connected to the test device and to its output through a feedback resistor. The feedback resistor is initially short circuited by a first switch to produce on the output and negative input a DC voltage corresponding to the reference voltage because of the high gain and causes a DC current signal to flow through the device under test. Then, the first switch is subsequently opened to cause the current signal to be transmitted through the feedback resistor, rather than such switch, and produce a corresponding voltage step signal at the output of the amplifier. This voltage step signal is propor-

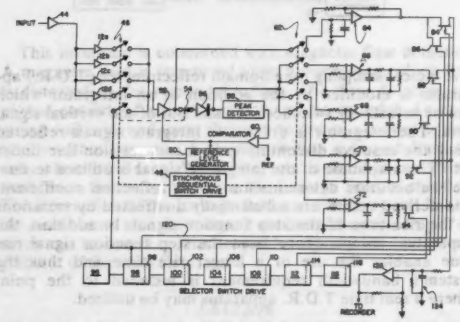
tional to the current signal and is transmitted through a coupling capacitor and an output amplifier to a voltage measurement device. The output terminal of such capacitor may be connected to ground through a second switch, which is initially closed to provide the step signal with a quiescent voltage level of zero, and is opened immediately before the opening of the first switch to prevent "droop" in the top of such step signal.

3,617,882

SPECTRUM ANALYZER WITH VARIABLE NORMALIZING MEANS AND MEANS FOR INDICATING THE DEGREE OF NORMALIZATION

Ken Y. Ishikawa, Bellflower, and Charles R. Johnson, La Mirada, both of Calif., assignors to North American Rockwell Corporation

Filed July 17, 1969, Ser. No. 842,503
Int. Cl. G01n *23/16*
U.S. Cl. 324—77 E **3 Claims**



A number of signals that can vary over a wide dynamic range and having a broad range of low-frequency variation are processed by long term integration circuits and then selectably switched for recording or display of an accurate and precision representation of frequency components and amplitudes. Precision processing of the signals is enabled by an electronic data-normalizing system that is interposed between the bank of input filters and the processing equipment. The recording or display includes an arrangement for sensing a unique phenomenon in the signals being received and initiating operation of the recorder at such time so as to record anomalous conditions. Information displayed is accompanied by a reference signal having a predetermined magnitude and coded to indicate a range of magnitude variations of the incoming signals.

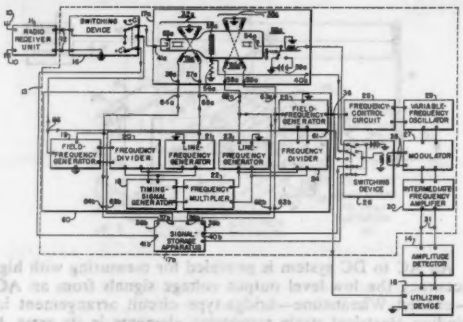
3,617,883

SPECTRUM-ANALYZING SYSTEM

Donald Richman, Flushing, N.Y., assignor to Hazeltine Research, Inc., Chicago, Ill.

Filed Apr. 4, 1952, Ser. No. 280,456
Int. Cl. G01r *23/14*
U.S. Cl. 324—77 C **7 Claims**

1. A spectrum-analyzing system comprising: a circuit for supplying the signals in a predetermined frequency spectrum; a plurality of signal-storage devices; means for causing said devices individually to be responsive to said supplied signals during different groups of recurrent intervals having durations longer than the interludes therebetween for individually storing effects representative of those of said supplied signals occuring during different ones of said groups of intervals, said groups of intervals being staggered in time and partially overlapping to diminish aperture distortion in the storing of said effects; a signal-deriving apparatus coupled to said storage devices; means for causing said deriving apparatus to be sequentially responsive to said stored effects at times corresponding to said interludes for deriving during each interlude from the effects stored in one of said intervals and at a rate higher than the storing rate thereof a plurality of groups of signals, each derived group being representative of those of said supplied signals occurring during said one interval; and signal-selecting means coupled to said deriving device



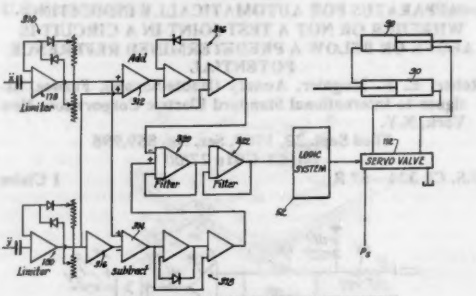
and including a network having a pass band narrow relative to the frequency range of each of said groups of derived signals for sequentially developing signals each having the frequency limits of said network and individually representative of different frequency bands of said groups of derived signals.

3,617,884

PHASE ANGLE MEASURING SYSTEM FOR VIBRATION DAMPERS OR THE LIKE

James A. Bonesho, Alexandria, Va., and John Gustave Bollinger, Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Division of Ser. No. 784,283, Dec. 6, 1968, Pat. No. 3,483,951.
Filed Aug. 18, 1969, Ser. No. 862,137
Int. Cl. G01r *25/00*
U.S. Cl. 324—83 A **1 Claim**



ANALOG CONTROL CIRCUIT FOR PHASE ANGLE MEASUREMENT THAT USES NO MULTIPLIERS

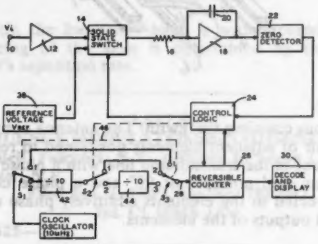
The disclosed system measures the phase angle between two signals and produces an error or difference signal which changes polarity at an angle of 90° and is a linear function of the phase angle. The system comprises first and second limiter means for deriving square waves of fixed amplitude corresponding to the first and second input signals. The sum and difference of such square waves are derived by adder means and first subtracter means. First and second absolute value means are provided to derive the absolute values of such sum and difference. Second subtracter means are utilized to derive the difference between such absolute values. Means are then provided to derive the mean value of the last mentioned difference. Such means value affords the desired error signal.

3,617,885

DIGITAL VOLTMETERS

Desmon Wheable, Farnborough, England, assignor to The Solartron Electronic Group Limited, Farnborough, England

Filed Feb. 27, 1968, Ser. No. 708,652
Claims priority, application Great Britain, Mar. 1, 1967, 9743/67
Int. Cl. G01r 17/06, 15/08
U.S. Cl. 324—99 D 9 Claims



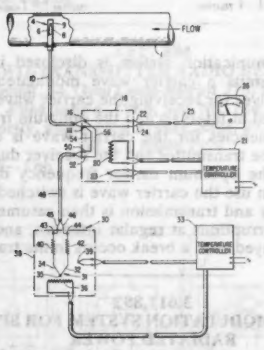
In a dual ramp digital voltmeter an input voltage is integrated for a standard number of clock pulses to ramp up the integrator output and then an opposing reference voltage is integrated to ramp down the integrator output to datum level again, the number of clock pulses during the ramp down being counted. In the present invention the clock pulse rate can be selectively varied in the ramp up or ramp down interval so as to effect range switching. Alternatively or additionally the clock pulse rate can be selectively varied as between different segments of the ramp down interval so as to yield a nonlinear relationship between the input voltage and the number of clock pulses counted during the ramp down.

3,617,886

TRANSDUCER OPEN-CIRCUIT FAILURE DETECTOR

John V. Werme, Painesville, Ohio, assignor to Bailey Meter Company

Filed July 26, 1968, Ser. No. 748,072
Int. Cl. G01r 1/00, 31/02
U.S. Cl. 324—110 7 Claims



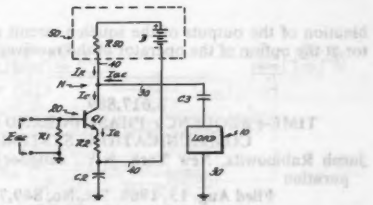
A high-impedance, open-circuit detector having a thermocouple generating a voltage proportional to the temperature level established by a controllable heater. The detector circuit voltage is applied in parallel with a low-impedance transducer measuring circuit at the input of a transducer monitoring circuit. The high-impedance detector voltage circuit is connected with the voltage polarity in reverse to the polarity of the transducer measuring circuit. The transducer measuring circuit is unaffected by the high-impedance detector voltage, and, therefore, the monitoring circuit responds only to the measuring circuit, while electrical continuity is maintained between the circuits. In the event the measuring circuit is electrically opened, the detector circuit will apply a reverse polarity voltage to the measuring circuit causing said circuit to indicate a condition wholly inconsistent with the range of the measuring transducer. This response to the detector voltage is an indication of open-circuit failure in the transducer measuring circuit.

3,617,887

VOLTAGE-TO-CURRENT CONVERTER FOR DRIVING A METER MOVEMENT

Harold David Alcaide, Bedford, Mass., assignor to Continental Electronics Manufacturing Co., Dallas, Tex.

Filed Apr. 18, 1968, Ser. No. 722,257
Int. Cl. G01r 19/26, 1/30
U.S. Cl. 324—120 4 Claims



An alternating voltage is converted linearly to an alternating current by circuitry which includes an amplifier operating as a first current source and responding to the alternating voltage. The collector current of the amplifier is composed of a direct component and an alternating component proportional, the latter being proportional to the alternating voltage. The two components are split into two separate lines connected to the collector. One line connects to a second constant-current generator which accepts only the direct component. The other line is the output line and contains a capacitor which accepts only the alternating component proportional to the alternating voltage. The proportional current in the output line may be rectified to operate a DC meter, and the response of the rectifier circuit is linear essentially to zero, while the complexity of the circuitry is substantially reduced with respect to conventional circuits.

3,617,888

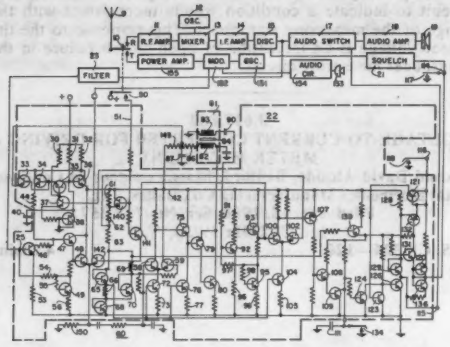
ENCODER-DECODER DEVICE FOR SELECTIVE SIGNALLING

George M. Hanus, Norridge; Alfred R. Lucas, Northbrook, and Frank R. Skutta, Mount Prospect, all of Ill., assignors to Motorola, Inc., Franklin Park, Ill.

Filed Aug. 7, 1969, Ser. No. 848,200
Int. Cl. H04b 1/48
U.S. Cl. 325—18 15 Claims

A tone signal encoder-decoder circuit uses an amplifier and a single tuned circuit for decoding and encoding a tone signal. A switching network enables a feedback circuit to cause operation of the circuit as an encoder and disables the feedback circuit to cause operation as a decoder. The DC operating levels for the circuit are increased and the source of operating potential for the frequency-responsive unit of the circuit operates through a higher impedance in the encoder mode. A provision also is made for facilitating rapid start for the encoding oscillator unit. Switching from the decoder to the encoder mode also disables the decoder mode preamplifier circuit and changes the biasing level of the detector to increase the threshold thereof when the circuit is in the encode mode of operation. A final provision is made for causing the radio receiver with which the circuit is employed to have the audio portion thereof selectively controlled by

the output of the detector in the encoder-decoder circuit or the output of the normal receiver squelch circuit or a combination of the outputs of the squelch circuit and the detector at the option of the operator of the receiver.

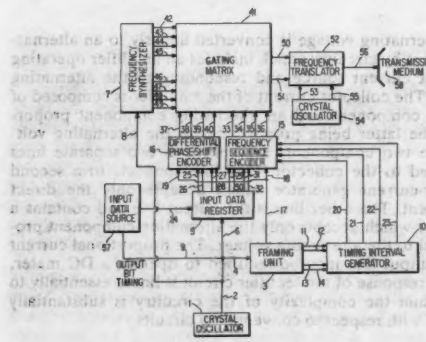


3,617,889

TIME-FREQUENCY-PHASE IN-BAND CODED COMMUNICATIONS SYSTEM

Jacob Rabinowitz, New York, N.Y., assignor to RCA Corporation

Filed Aug. 13, 1969, Ser. No. 849,753
Int. Cl. H04l *27/30;* **H04b** *7/12*
U.S. Cl. 325—30 **27 Claims**



A communication system which uses a diversity technique to overcome problems of signal fading and multipath distortion. Frequency shift keying (FSK) and differential phase shift keying (DPSK) are employed in combination to code a sequence of signals responsive to a word represented by a stream of input binary digits. The sequences of signals to be transmitted are arranged such that identification of the frequency, phase shift and location of one signal in the sequence uniquely defines the input word.

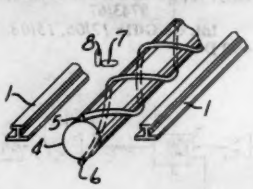
3,617,890

INDUCTION RADIO SYSTEM FOR VEHICLES

Noritaka Kurauchi, Suita, and Kenichi Yoshida, Sakai, both of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Jan. 11, 1968, Ser. No. 697,069
Claims priority, application Japan, Jan. 12, 1967, 42/2324, Feb. 16, 1967, 42/9981; Mar. 20, 1967, 42/17274, 42/17276, 42/17277, 42/17278; June 18, 1967, 42/38985
Int. Cl. H04b *7/10;* **H01q** *1/36*
U.S. Cl. 325—51 **9 Claims**

An induction-radio system with a low induced noise level and unwanted radiation level for transmission of communication and control signals between a vehicle following a track and wayside station. The transmission line is positioned in parallel along the track and consists of two conductors helically wound with an equal and constant pitch and the antenna is mounted on the vehicle adjacent the transmission line



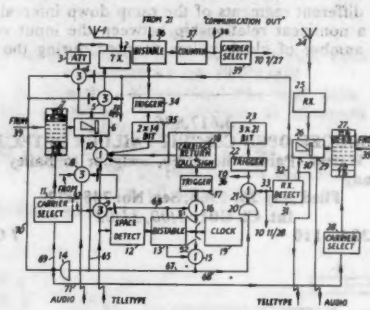
for continuous coupling therewith. The antenna consists of at least one pair of adjacent elements positioned to receive the carrier current in the transmission line with a phase shift difference of an odd multiple of 90° and a phase combining means connected to the elements additively phase combines the received outputs of the elements.

3,617,891

OPTIMUM FREQUENCY DETERMINING RADIO COMMUNICATION SYSTEM

Dennis Henry Covill, Nova Scotia, Canada, assignor to E.M.I. Electronics Canada Limited, Nova Scotia, Canada

Filed May 26, 1969, Ser. No. 827,663
Int. Cl. H04b *1/50;* **H04l** *7/00*
U.S. Cl. 325—53 **8 Claims**



A radio communication system is disclosed in which a transmitter transmits a carrier wave modulated by intelligence to a receiver for receiving the carrier wave, transmission is interrupted at intervals and the optimum frequency in a range of frequencies for the carrier wave is determined with the aid of the transmitter and the receiver during the interruptions. If the optimum carrier frequency differs from that previously in use the carrier wave is switched to the optimum frequency and transmission is then resumed. A clock initiates the interruptions at regular intervals, and the interruptions are delayed until a break occurs in the traffic.

3,617,892

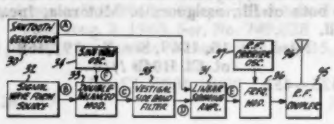
FREQUENCY MODULATION SYSTEM FOR SPREADING RADIATED POWER

James J. Hawley, and Francis H. Taylor, both of Cranbury, N.J., assignors to RCA Corporation

Filed Feb. 27, 1967, Ser. No. 618,836
Int. Cl. H04b *1/02, 7/20*
U.S. Cl. 325—145 **7 Claims**

A communications system for use in a frequency band having a restricted spectral power flux density uses a transmitter having a specified carrier frequency within the band. A linear sawtooth generator's output is summed together with an information bearing signal in a linear adding amplifier to produce a composite signal. The composite signal is then

used to frequency modulate a carrier frequency oscillator whose energy is caused to spread out over the frequency band such that the amount of energy in each of a group of



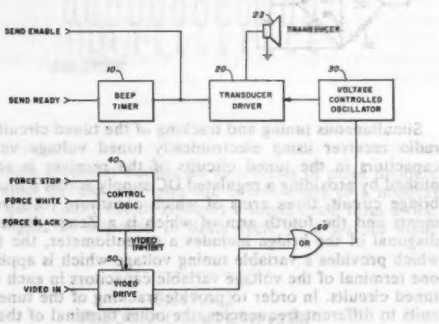
slots within the frequency band is within permitted limits. The spacing of the slots is determined by the sawtooth generator's repetition rate.

3,617,893

FREQUENCY MODULATED SIGNAL GENERATOR

Allan J. Bell, Fairport, N.Y., assignor to Xerox Corporation, Rochester, N.Y.

Filed Jan. 2, 1969, Ser. No. 789,087
Int. Cl. H04b 1/04
U.S. Cl. 325—145 7 Claims



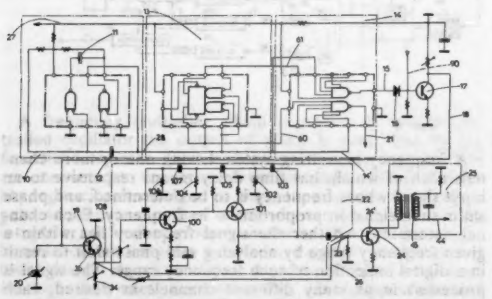
In a data communication system a modulator for use in generating frequency modulated signals. A plurality of frequencies is generated in response to information and other supervisory signals applied thereto by utilizing logic and other type circuitry in accordance with a predetermined priority of input signals.

3,617,894

TWO-TRANSMITTER RADIO BEACON

Marcel E. Benoit, 34, Quai Louis-Bleriot, (75) Paris, 16°, France

Filed June 4, 1968, Ser. No. 734,321
Claims priority, application France, Sept. 27, 1967, 122,394
Int. Cl. H04b 1/04
U.S. Cl. 325—166 5 Claims



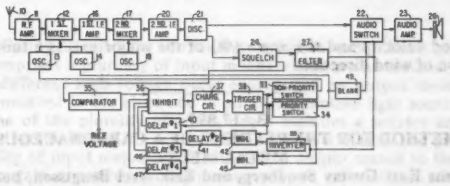
. A radio beacon generating an audio-modulated UHF signal has two transmitters keyed by the outputs of independent square-pulse generators. Each pulse generator works into an associated amplifier stage, an inversion of the output of the pulse generator feeding the first transmitter being also supplied to the amplifier stage of the second transmitter (in parallel with the output of the other pulse generator) whereby the complement of the keying signal of the first or master transmitter normally overrides the keying signal of the second or slave transmitter and the two transmitters operate at interleaved intervals. If the master transmitter should fail, the slave transmitter continues operating in the rhythm of its own keying signal.

3,617,895

MULTI-FREQUENCY RECEIVER WITH AUTOMATIC CHANNEL SELECTION AND PRIORITY CHANNEL MONITORING

Stanley J. Tomsa, Chicago, and David F. Willard, Schaumburg, both of Ill., assignors to Motorola, Inc., Franklin Park, Ill.

Filed Aug. 8, 1969, Ser. No. 848,627
Int. Cl. H04b 1/32
U.S. Cl. 325—334 9 Claims



A switching system for a receiver with a plurality of local oscillators for operating on different channels renders the oscillators operative in turn, with the switching system being latched when a carrier is received to hold the receiver on the channel having the carrier. One channel is designated a priority channel, and the oscillator for that channel is operated at recurring short periods when another channel is being received in order to continually sample the priority channel. If a signal is detected on the priority channel during the sampling interval, the receiver locks onto the priority channel until the carrier on that channel terminates. The length of time that the priority channel is sampled during reception on another channel is variable in that there are no circuit time constants which force the circuitry to return to the nonpriority channel after a fixed length of time. When the system samples the priority channel, it stays on the priority channel until noise is detected. If a marginal signal is on the priority channel or if a statistical noise null is present, the sample length is extended until noise reappears on the priority channel.

3,617,896

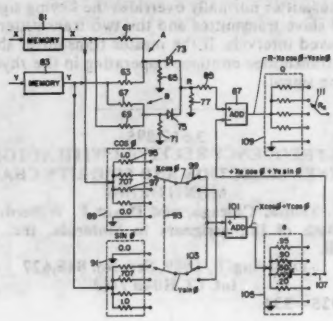
ELLIPTICAL FUNCTION SIMULATION SYSTEM

Thomas W. McCurnin, and Lloyd J. Perper, both of Tucson, Ariz.

Filed Jan. 22, 1969, Ser. No. 793,124
Int. Cl. H04b 1/00
U.S. Cl. 325—363 5 Claims

A simulation system including a control device, a master transmitter, a plurality of slave transmitters and a plurality of receivers. The master and slave transmitters are physically spaced apart and their transmission signals form a hyperbolic grid network. The receivers are positioned within the hyperbolic grid network and process the signals from the master and slave transmitters to simulate dose and dose rate from yield and fallout information of a simulated detonation that takes place in the hyperbolic grid network. The yield (Y*i*) information is processed by the receivers as a pulse train having a frequency that decreases exponentially with time. The X and Y rectangular coordinate information is converted into the polar coordinate system to eliminate the necessity of performing complex square or square root functions for detecting the actual distance R. To determine fallout the actual distance R is converted to an effective distance R_E to take

into account wind direction and velocity by employing an elliptical function where the eccentricity (e) is a function of



wind velocity and the angle (Φ) of the major axis is a function of wind direction.

3,617,897

METHOD FOR THE REFINING OF A CARBONACEOUS METAL MELT

Hans Karl Gustav Sandberg, and Erik Axel Bengtsson, both of Borlange, Sweden, assignors to Stora Kopparbergs Bergslags Aktiebolag, Falun, Sweden

Filed Apr. 22, 1969, Ser. No. 818,252
Claims priority, application Sweden, Apr. 25, 1968, 5618
Int. Cl. C21c *5/32*
U.S. Cl. 75—60 **9 Claims**

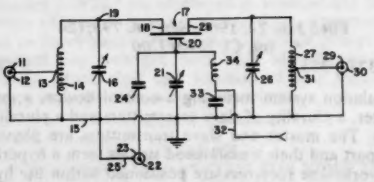
The final phase of carbonaceous metal melt refining operation is carried out with a deficiency of oxygen in the furnace space in order to reduce the wear of the furnace lining without decreasing the content of iron oxide in the slag.

3,617,898

ORTHOGONAL PASSIVE FREQUENCY CONVERTER WITH CONTROL PORT AND SIGNAL PORT

Eugene A. Janning, Jr., West Chester, Ohio, and Avco Corporation, Cincinnati, Ohio

Filed Apr. 9, 1969, Ser. No. 814,772
Int. Cl. H04b *1/26*
U.S. Cl. 325—451 **1 Claim**



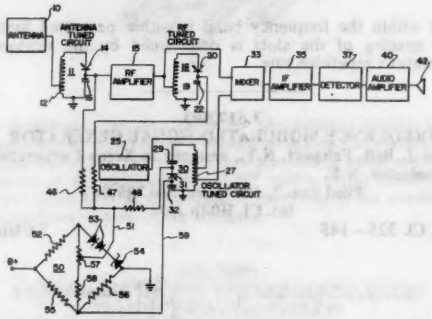
A field effect transistor is so arranged that a radio frequency input signal is applied to a signal port, comprising the source drain circuit. A local oscillator applies the locally generated oscillations to the control port, comprising the gate and source electrodes. The combination is operated as an orthogonally pumped resistive mixer. The resistive nonlinearity of the signal port is controlled only by the local oscillator pump signal voltage applied to the control port.

3,617,899

TUNING CONTROL FOR MULTIPLE ELECTRONICALLY TUNED CIRCUITS

Nikolai Goncharoff, Roselle, and Kamil Y. Jabbar, River Grove, both of Ill., assignors to Motorola, Inc., Franklin Park, Ill.

Filed Jan. 15, 1969, Ser. No. 791,468
Int. Cl. H04b *1/16*
U.S. Cl. 325—452 **13 Claims**



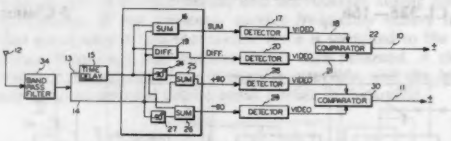
Simultaneous tuning and tracking of the tuned circuits in a radio receiver using electronically tuned voltage variable capacitors in the tuned circuits of the receiver is accomplished by providing a regulated DC supply across a four-arm bridge circuit, three arms of which constitute resistive elements and the fourth arm of which is a Zener diode. The diagonal of the bridge includes a potentiometer, the tap of which provides a variable tuning voltage which is applied to one terminal of the voltage variable capacitors in each of the tuned circuits. In order to provide tracking of the tuned circuits to different frequencies, the other terminal of the voltage variable capacitors in each of the circuits is provided with different DC reference potentials, so that the circuits are tuned together to provide tracking with a predetermined offset.

3,617,900

DIGITAL FREQUENCY DETECTING SYSTEM

Charles Fink, Silver Spring; Fred E. Burnham, Silver Spring, and Maury I. Marks, Bowie, all of Md., assignors to Litton Systems, Inc., Silver Spring, Md.

Filed July 7, 1966, Ser. No. 555,858
Int. Cl. G01r *23/12*
U.S. Cl. 324—82 **7 Claims**



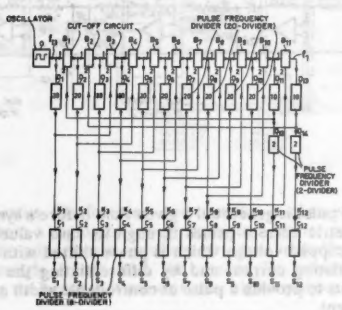
A frequency measuring system having one or more channels each of which, has time delay means responsive to an input signal whose frequency is to be determined, and phase shifts such signal in proportion to its frequency. Each channel determines whether the signal frequency lies within a given frequency range by analyzing said phase shift to result in a digital indication of such frequency range. The signal is processed in as many different channels as desired, each channel determining a different frequency range. Each channel also includes resolution improving means for resolving ambiguity in the analysis of the phase shift therein.

3,617,901

METHOD OF PRODUCING TONES OF AN EQUALLY TEMPERED SCALE

Nico Valentinus Franssen, Emmasingel, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 2, 1968, Ser. No. 749,828
Claims priority, application Netherlands, Aug. 15, 1967, 6711170
Int. Cl. H03b *19/00*
U.S. Cl. 328—17 11 Claims



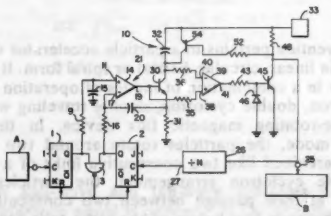
A single oscillator connected to a series of pulse dividers and cutoff circuits generates the twelve tones of a musical scale. Each cutoff circuit removes a single cycle from a first input signal in response to each cycle of a second input signal.

3,617,902

FREQUENCY MULTIPLIER

Douglas M. Bauer, Danvers, Mass., assignor to General Electric Company

Filed Aug. 4, 1970, Ser. No. 60,819
Int. Cl. H03k *5/00*
U.S. Cl. 328—38 6 Claims



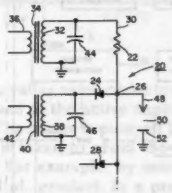
A frequency multiplier which comprises a voltage-controlled oscillator the output of which is controlled by differential integrator. First and second bistable logic circuits are connected to the inputs of the integrator. The first bistable logic circuit changes its state in response to an input pulse to produce a control voltage for the oscillator from the integrator. A feedback loop from the oscillator to the second bistable circuit includes a counter coupled to the second bistable logic circuit to change the state of the second bistable logic and resets the first circuit after a predetermined number of output pulses. This sequence controls the input level to the voltage-controlled oscillator, and hence the multiplication factor of the circuit.

3,617,903

CONDITION RESPONSIVE HIGH-VOLTAGE GATE

Andrew E. Trolio, 210 Carlton Ave., Broomall, Pa., and Edward G. Busch, 454 Malin Road, Newton Square, Pa.

Continuation of application Ser. No. 507,145, Nov. 10, 1965, now abandoned. This application Sept. 29, 1969, Ser. No. 863,026
Int. Cl. H03k *17/74*
U.S. Cl. 328—94 3 Claims



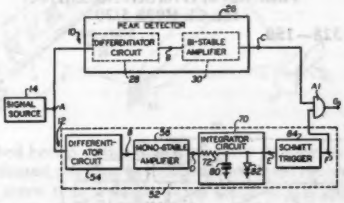
Gating circuitry for ultraminiature light sources. Each gate comprises a plurality of input means which are connected to a different high-voltage pulse source and an output means connected to the electrode of an ultraminiature light source. One of the plurality of input means includes a resistor and the remainder of the inputs each includes a diode. The plurality of input means are connected to output means so that the gate energizes the light source upon coincidence of a pulse generated at each of the voltage sources.

3,617,904

NOISE INSENSITIVE PEAK DETECTOR

Francis C. Marino, Huntington, N.Y., assignor to Digitronics Corporation, Albertson, N.Y.

Filed June 5, 1969, Ser. No. 830,838
Int. Cl. H03k *5/20*
U.S. Cl. 328—117 5 Claims



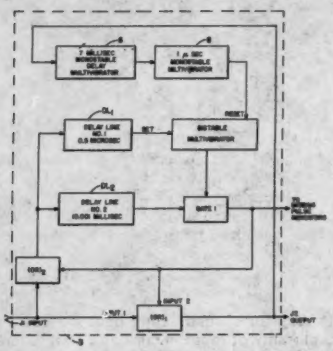
A noise insensitive peak detector which includes a first signal path and a second signal path both of which are adapted to be connected to a signal source wherein the source signal may comprise noise signals in addition to information signals. The first path includes a peak detector which produces a pulse in response to the peaks in the source signal. The second signal path includes a first pulse-producing means for producing first pulses in response to the portions of the source signal having substantially zero slope and second pulse-producing means for producing second pulses in response to said first pulses having a width greater than a preselected width. Coincidence means is provided which is connected to the first and second paths and is responsive to the coincidence of the output of the peak detector and the second pulses for producing an output pulse.

The invention also includes the novel noise rejection system in said second path.

3,617,905
MISSING PULSE GENERATOR

Joseph N. Castelli, Kwajalein, Marshall Islands, assignor to Sylvania Electric Products, Inc.

Filed Dec. 1, 1969, Ser. No. 881,032
Int. Cl. H04b 1/04
U.S. Cl. 328—120 3 Claims

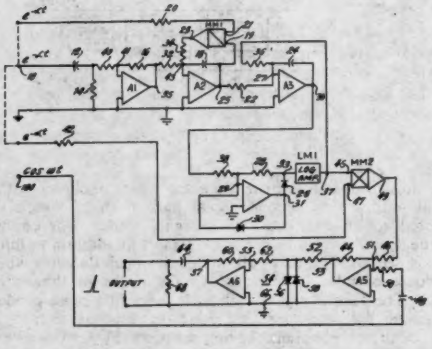


A device for supplying a pulse when a pulse is missing from a continuous train of pulses. The continuous train of pulses passes directly through the device and also to delay lines which delay each pulse so that it appears at the input of a gate circuit at approximately the same time as the next successive pulse would appear at the output of the device. If a pulse is missing, a previously received delayed pulse is passed by the gate to the output. When a pulse does appear, it inhibits the gate circuit from passing the delayed pulse.

3,617,906
CURRENT ZERO ANTICIPATING CIRCUIT FOR ASYMMETRIC WAVES

Ruben D. Garzon, Malvern, Pa., assignor to I-T-E Imperial Corporation, Philadelphia, Pa.

Filed May 6, 1970, Ser. No. 35,174
Int. Cl. H03k 5/20
U.S. Cl. 328—150 6 Claims

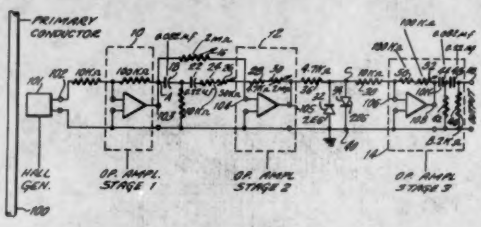


A signal pulse is generated a given time before an asymmetric current passes through its zero value by phase shifting both the sinusoidal term and exponential term of the defining current waveform, by adding the two-phase shifted components, and by processing the resulting phase shifted wave to obtain the pulses where desired.

3,617,907
CURRENT ZERO-ANTICIPATING CIRCUIT

Ruben D. Garzon, Malvern, Pa., assignor to I-T-E Imperial Corporation, Philadelphia, Pa.

Filed May 28, 1970, Ser. No. 41,421
Int. Cl. H03k 5/20
U.S. Cl. 328—150 9 Claims

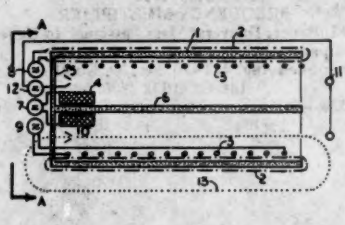


A signal pulse is generated a given time before a symmetric or asymmetric current passes through its zero value by obtaining a clipped voltage which is phase shifted with respect to the initiating current and by differentiating the clipped components to provide a pulse of controllable width and time displacement.

3,617,908
CHARGED PARTICLE ACCELERATOR WITH SINGLE OR MULTIMODE OPERATION

Henry Greber, 225 West, 80th Street, Apt. 8-D, New York, N.Y.

Filed Feb. 24, 1969, Ser. No. 801,276
Int. Cl. H05h 9/02, 11/00, 13/00
U.S. Cl. 328—233 4 Claims



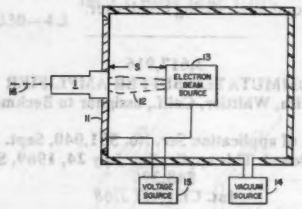
This invention pertains to a particle accelerator which can be made in linear, circular, helical or spiral form. It functions in one, or in a combination of modes of operation as a double betatron, double cyclotron, double traveling wave tube, or double-rotating magnetic flux device. In the double betatron mode, the particles rotate around two magnetic fluxes intertwined like two consecutive links of a chain. In the double cyclotron arrangement, the particles are accelerated at their passage between two consecutive tubes, and also between two halves of the same tube section, split longitudinally. In the traveling wave tube mode, the particles are accelerated through their energy exchange with traveling waves flowing along a coiled coil helical winding. In the arrangement with two sets of windings producing two interlinked rotating magnetic fluxes, the particles act like free electrons in the rotor of an asynchronous motor. In any one, or in any combination of these modes of operation of this particle accelerator, the particles perform a motion along a helical path, along which they cut the lines of the magnetic force of a radial, stationary, (DC excited) magnetic flux, which induces in them an electromotive force in direction of their acceleration. Normally, this particle accelerator is evacuated, but it can also be filled with a semiconductor, semimetal, or electrolyte, with the result of a considerable simplification of the device. This accelerator can be used for single, or for repeated passages of the particles through it.

3,617,909

ELECTROSTATIC LENS AND FEED-THROUGH

Thomas E. Horton, Jr., Oxford, Miss., and Charles M. Cason, III, Huntsville, Ala., assignors to The United States of America as represented by the Secretary of the Army

Filed Dec. 23, 1969, Ser. No. 887,601
Int. Cl. H01j 29/58
U.S. Cl. 328—228 4 Claims



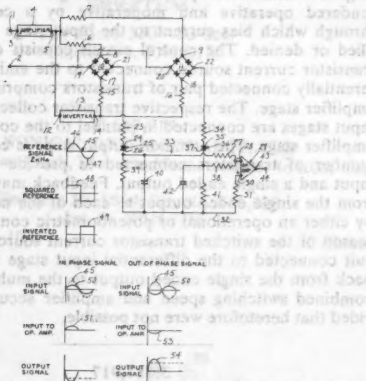
Apparatus for focusing and passing a charged particle beam from a region of low pressure to a higher pressure region. The apparatus is a unitary structure including both the feed-through means and the means for electrostatically focusing the beam as it passes to the higher pressure region.

3,617,910

PHASE AND AMPLITUDE DETECTORS

Odo J. Struger, Milwaukee, Wis., assignor to Allen-Bradley Company, Milwaukee, Wis.

Filed Apr. 2, 1970, Ser. No. 25,069
Int. Cl. H03d 5/00
U.S. Cl. 329—166 7 Claims



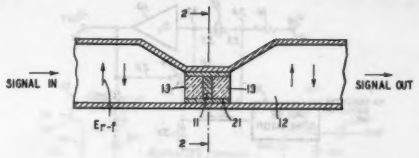
In both half-wave and full-wave detectors a 2 kHz., squared reference signal is imposed on DC terminals on one side of a pair of diode gates, and, inverted, on DC terminals on an opposite side of a pair of diode gates. A 2 kHz. input signal is connected to one AC terminal of both diode gates. The other AC terminals of the diode gates are connected to the input terminals of an inverting operational amplifier on the output terminal which the detector output signal appears. In the half-wave detector, the diode gates are uniformly oriented with respect to the reference signal and the AC terminals of the diode gates are both connected directly to the inverting input terminal of the operational amplifier. In the full-wave embodiment, the diode gates are oppositely oriented with respect to the reference signal and one of the diode gates has its AC terminal connected to the noninverting input terminals of the operational amplifier while the other diode gate has its AC terminal connected to the inverting input terminal of the operational amplifier.

3,617,911

WIDE BAND DIRECT-CURRENT-PUMPED SEMICONDUCTOR MASER

John A. Copeland, III, Gillette, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 1, 1969, Ser. No. 812,115
Int. Cl. H01s 1/00
U.S. Cl. 330—4 18 Claims



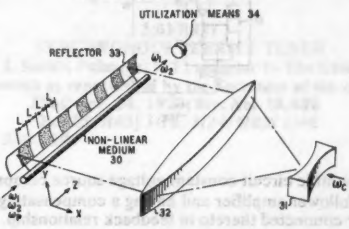
A wafer of two-valley semiconductor material such as gallium arsenide is used as the active negative temperature medium of a maser. The maser is pumped by a DC voltage across the wafer. Care is taken to avoid the formation of Gunn-effect domains as, for example, by using a wafer with an appropriately small nL product. In a preferred embodiment, a magnetic field across the wafer increases bandwidth, efficiency, and frequency of operation. A layer of a material, such as GaP, having a lower energy valley corresponding to the upper valley of the active medium, may be included between the cathode contact and the active medium for further improving efficiency.

3,617,912

TRAVELING WAVE PARAMETRIC DEVICES WITH DISTRIBUTED COUPLING OF MORE THAN A SINGLE PUMP

Stewart E. Miller, Middletown Township, Monmouth County, N.J., assignor to Bell Telephone Laboratories Incorporated, Murray Hill, N.J.

Filed Apr. 4, 1969, Ser. No. 813,425
Int. Cl. H03f 7/04
U.S. Cl. 330—4.6 10 Claims



Described herein optical traveling wave parametric devices with distributed coupling in nonlinear solid waveguide media, to which more than a single pump frequency is applied. In order to satisfy simultaneously the parametric relation involving frequencies and the parametric relation involving wave propagation constants, at least one of these pumps has a controllably variable frequency or a controllably variable component of propagation constant along the direction of propagation of the other pump. This invention is especially useful for optical parametric amplification or frequency conversion.

3,617,913

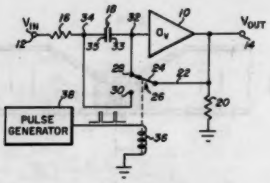
CHOPPER STABILIZED DC AMPLIFIER

Rolf Schmidhauser, Palo Alto, and S. Cameron Reid, Mountain View, both of Calif., assignors to Data Technology Corporation, by said Rolf Schmidhauser

This application filed under Rule 47
Filed Aug. 15, 1968, Ser. No. 757,206
Int. Cl. H03f 1/02, 1/36
U.S. Cl. 330—9 3 Claims

A chopper stabilized DC amplifier including a capacitive memory unit and a pair of alternately connected feedback

loops. When the first loop is connected, one side of the capacitor is charged to a voltage V_{off} which is equal in magnitude to the drift voltage of the amplifier, and the other side is charged to the input voltage V_{in} such that the charge across the capacitor equals $V_{in}-V_{off}$. When the first loop is disconnected and the other loop is connected to the other



side of the capacitor, the output voltage V_{out} of the amplifier is driven equal to V_{in} as the amplifier attempts to maintain V_{off} equal to the amplifier drift. At a duty cycle of 100 to 1 a chain of pulses is produced, the amplitudes of which are equal to the instantaneous value of the input signal and are completely independent of any drift in the amplifier.

3,617,914

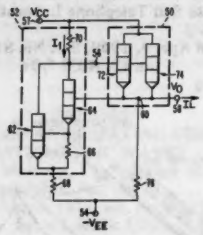
MONOLITHIC CONSTANT VOLTAGE SOURCE

Jack A. Dorler, Wappingers Falls, and Rocco Robortaccio, Fishkill, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed July 7, 1969, Ser. No. 839,493

Int. Cl. H03f 1/32

U.S. Cl. 330—23 **5 Claims**



A monolithic circuit constant voltage source comprising an emitter-follower amplifier and having a compensating voltage amplifier connected thereto in feedback relationship.

3,617,915

TUNING CIRCUIT HAVING A NEUTRALIZING CIRCUIT

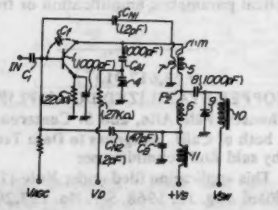
Kiyoshi Amemiya, Yokohama, and Kazuhiko Yamazaki, Fujisawa, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed June 26, 1970, Ser. No. 50,187

Claims priority, application Japan, June 29, 1969, 44/51135

Int. Cl. H03f 1/14

U.S. Cl. 330—27 **2 Claims**



An electronic tuning circuit comprising a serial circuit of a high-frequency band tuning coil and a low-frequency band tuning coil for tuning with broadcast waves having channels in the high- and low-frequency bands, the serial circuit being connected with an amplifier element, whereby during the tuning with the high-frequency band the low-frequency band tuning coil is AC grounded and a first neutralizing condenser is connected between the input terminal of the amplifier element and a coil electromagnetically coupled to the high-frequency band coil to thereby feed back the output signal of the amplifier element to the input, and during the tuning with the low-frequency band the low frequency band tuning coil produces an output signal which is fed back to the input through a second neutralizing condenser.

3,617,916

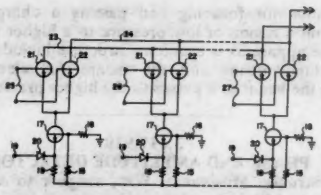
COMMUTATED BUFFER AMPLIFIER

Leland B. Smith, Whittier, Calif., assignor to Beckman Instruments, Inc.

Continuation of application Ser. No. 581,040, Sept. 21, 1966, now abandoned. This application July 24, 1969, Ser. No. 848,396

Int. Cl. H05f 3/68

U.S. Cl. 330—30 **10 Claims**



The invention discloses a new and improved muliplex system wherein each of a multiplicity of inputs are sequentially connected by a switched differential input amplifier stage to a common output amplifier stage. Each input stage is rendered operative and inoperative by a control circuit through which bias current to the input stage is either supplied or denied. The control circuit consists of a switched transistor current source connected to the emitters of a differentially connected pair of transistors comprising the input amplifier stage. The respective transistor collectors of all the input stages are connected in parallel to the common output amplifier stage. The common output stage is composed of a number of transistors connected to provide a differential input and a single ended output. Feedback may be provided from the single ended output to each of the multiple inputs by either an operational or potentiometric configuration. By reason of the switched transistor current source control circuit connected to the differential input stage and the feedback from the single ended output to the multiple inputs, a combined switching speed and amplifier accuracy are provided that heretofore were not possible.

3,617,917

CONVERGING SOLID-STATE LASER ELEMENT FOR HIGH-POWER OUTPUT USE

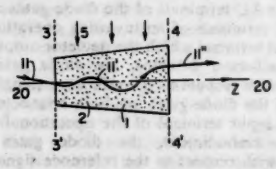
Teiji Uchida, Tokyo, Japan, assignor to Nippon Selfoc Company, Limited, Tokyo, Japan

Filed Nov. 17, 1969, Ser. No. 877,238

Claims priority, application Japan, Nov. 16, 1968, 43/83,672

Int. Cl. H01s 3/00

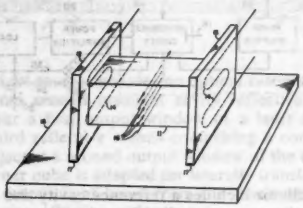
U.S. Cl. 330—4.3 **1 Claim**



A converging laser element having an index of refraction distribution of $n=N(1-\frac{1}{2}ar^2)$ is disclosed wherein at least N

or *a* varies along the axis of the element. As a result, the spot size at the output end of the element can be made greater than the incident spot size at the input end surface.

3,617,918
RAPID FREQUENCY SCANNING OF TEMPERATURE TUNED OPTICAL PARAMETRIC OSCILLATORS
Herbert Rabin, Bethesda, Md., assignor to The United States of America as represented by the Secretary of the Navy
Filed Sept. 9, 1969, Ser. No. 856,294
Int. Cl. H01s *3/00, 3/10*
U.S. Cl. 330—4.3 **5 Claims**

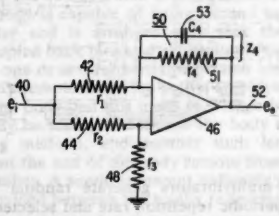


This disclosure is directed to a means and method of changing the operating frequency of optical parametric amplifiers or oscillators over a wide range of frequencies by establishing a thermal gradient in a nonlinear crystal such as lithium niobate or barium-sodium niobate compositions of matter.

ERRATUM

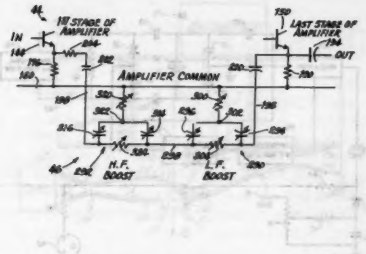
For Class 330—53 see:
Patent No. 3,618,126

3,617,919
CANONICAL ORTHOGONAL FILTER
Albert Andrews Clark, Woburn, Mass., assignor to RCA Corporation
Filed July 30, 1969, Ser. No. 846,028
Int. Cl. H03f *1/36*
U.S. Cl. 330—107 **2 Claims**



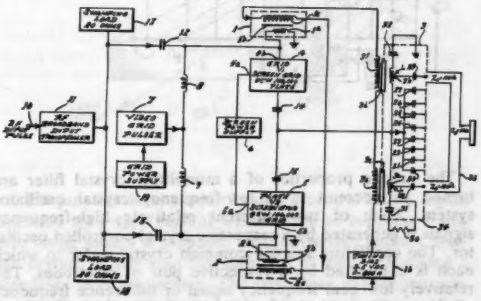
A canonical orthogonal filter is accurately synthesized from a particular transfer function. Filters are provided having a first and second resistor respectively connected to first and second input terminals of a differential amplifier. A third resistor is connected from one amplifier input terminal to a point of reference potential, and the parallel combination of a fourth resistor and a capacitor is connected from the other input terminal of the amplifier to the output terminal of the amplifier which is also the output terminal of the filter.

3,617,920
AUDIO EQUALIZATION SYSTEM
John P. Jarvis, Northridge, Calif., assignor to Scientific Industries, Inc., Santa Ana, Calif.
Division of Ser. No. 714,592, Mar. 20, 1968, Pat. No. 3,541,260.
Filed Jan. 26, 1970, Ser. No. 5,688
Int. Cl. H03f *1/34*
U.S. Cl. 330—109 **5 Claims**



The disclosed audio equalization system comprises an amplifier, a negative feedback path between the output and the input of said amplifier, a low-frequency equalization network connected into said negative feedback path, and a high-frequency equalization network connected into said path in cascade with said low-frequency equalization network, each network comprising a pair of series connected capacitors, a first resistor connected between the junction of said capacitors and the common terminal of the amplifier, and a second resistor connected in parallel with said series connected capacitors. A switching system or the like is preferably provided to change the values of said capacitors so as to change the boost frequency range. Means are preferably provided for changing the value of the first resistor while inversely changing the value of the second resistor for changing the extent of the boost.

3,617,921
SYNCHRONOUS FERRITE TUNER
William I. Smith, Palmyra, N.J., assignor to The United States of America as represented by the Secretary of the Air Force
Filed Apr. 14, 1970, Ser. No. 28,486
Int. Cl. H03j *3/16, 3/24;* H03f *1/46*
U.S. Cl. 330—207 **1 Claim**

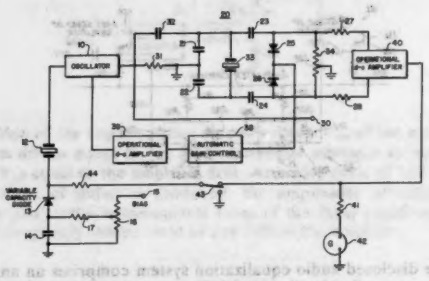


A synchronous ferrite tuner for an RF amplifier in which tuning is performed by applying a single DC control current to set simultaneously the inductance of ferrite cores in both grid and plate circuit resonators.

3,617,922
CRYSTAL OSCILLATOR WITH PHASE CONTROL LOOP INCLUDING A CRYSTAL DISCRIMINATOR

Marvin Bernstein, Asbury Park, N.J., assignor to The United States of America as represented by the Secretary of the Army

Filed May 28, 1970, Ser. No. 41,341
Int. Cl. H03b 3/04; H03d 3/16
U.S. Cl. 331—1 5 Claims

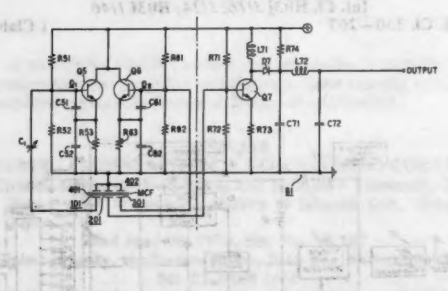


A crystal oscillator is phase controlled by means of a feedback loop containing a tuned crystal discriminator which supplies a corrective signal to a variable capacitance diode in series with the oscillator crystal.

3,617,923
BEAT FREQUENCY GENERATOR USING TWO OSCILLATORS CONTROLLED BY A MULTIRESONATOR CRYSTAL

Robert E. Paradysz, Coopersburg, and Warren L. Smith, Allentown, both of Pa., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 6, 1969, Ser. No. 874,453
Int. Cl. H03b 5/36, 21/00
U.S. Cl. 331—43 14 Claims



The unique properties of a monolithic crystal filter are turned to account in a low-frequency crystal oscillator system. Each of two different relatively high-frequency signals is generated by a respective crystal controlled oscillator. The oscillators share a common crystal wafer to which each is connected by a respective pair of electrodes. The relatively low beat frequency signal or difference frequency of the oscillators is extracted by a third set of electrodes mounted on the crystal between the electrode pairs connected to the oscillators.

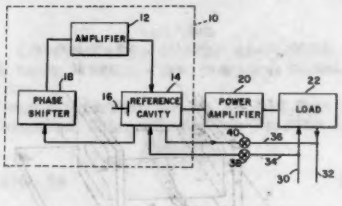
ERRATA

For Classes 331—54 and 331—179 see:
Patent Nos. 3,618,127 thru 3,618,132

3,617,924
AUTOMATIC FREQUENCY TUNING SYSTEM

Hyoa Fujita, and Kouichi Irie, both of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 14, 1969, Ser. No. 815,618
Claims priority, application Japan, Apr. 17, 1968, 43/25678
Int. Cl. H03b 5/18
U.S. Cl. 331—70 4 Claims

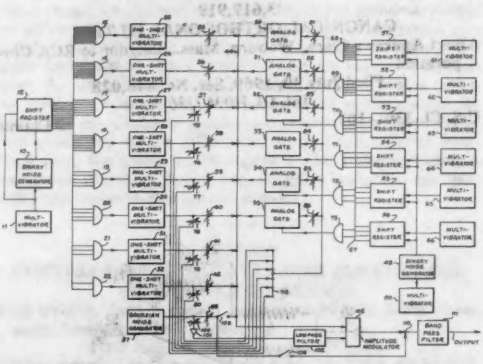


An oscillator includes a reference cavity and a load cooled with a cooling water supplied by a single water source for the purpose of controlling an oscillation frequency in accordance with the temperature of the load.

3,617,925
SIMULATOR FOR ATMOSPHERIC RADIO NOISE

William D. Bensema; Robert M. Coon; Wesley M. Beery; Clark C. Watterson, and Earl C. Bolton, all of Boulder, Colo., assignors to The United States of America as represented by the Secretary of Commerce

Filed June 9, 1970, Ser. No. 44,842
Int. Cl. H03b 29/00
U.S. Cl. 331—78 17 Claims



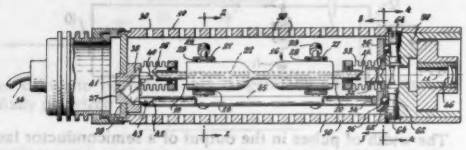
One-shot multivibrators generate random impulses that have a nonperiodic repetition rate and selected probabilities of occurrence. Each of several analog gates has a different probability that it will open during a predetermined time interval; the durations of the open-periods have random values. When an analog gate is open, it passes a burst of impulses generated by the multivibrators during the open-period. In another source Gaussian noise is also generated. The impulses and bursts are applied to an amplitude modulator. A portion of the noise frequency band functions as a modulating signal so that the impulses in the modulator output have amplitudes that vary randomly. Gaussian noise is added to the modulator output before a final band-pass filter in the simulator.

3,617,926

LASER USING A CUBE CORNER REFLECTOR AT ONE END OF THE DISCHARGE TUBE SO THAT BOTH CAVITY REFLECTORS ARE AT THE OTHER END TO COMPENSATE FOR THERMAL DISTORTION

Henry W. Bullinger, Wilton, Conn., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Oct. 3, 1968, Ser. No. 764,663
Int. Cl. H01s 3/05
U.S. Cl. 331—94.5 7 Claims



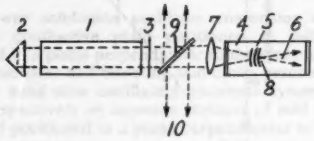
This laser light source includes an optical resonator cavity having first and second resonant cavity reflective surfaces positioned near a first output window of a laser discharge tube and a third reflective means comprising a corner cube positioned adjacent a second output window of the discharge tube. The corner cube is adapted for laterally translating and reflecting an output light beam from the discharge tube to the second cavity reflective surface.

3,617,927

ARRANGEMENT FOR CONTROLLING THE Q-FACTOR OF A RESONATOR OF AN OPTICAL EMITTER OF COHERENT ELECTROMAGNETIC RADIATION, FOR THE PURPOSE OF GENERATING GIANT PULSES

Dieter Pohl, No. 5b, Otztalerstrasse, Munich 25, Germany

Filed Jan. 19, 1968, Ser. No. 699,260
Claims priority, application Germany, Jan. 31, 1967, P 41324
Int. Cl. H01s 3/11
U.S. Cl. 331—94.5 9 Claims



An arrangement for controlling the Q-factor of a resonator of an optical emitter of coherent electromagnetic radiation is provided which consists of a body serving as Q-control member located in a line with and at the same end of an active amplifying medium as at least one partial reflector which end is opposite the end at which a totally reflecting prism is located. The body is capable of being excited to stimulated Brillouin scatter and is arranged such that the scattered radiation is coupled back into said active amplifying medium. There may be one or several partial reflectors located at the end of the body remote from the active amplifying medium and between the body and this medium, respectively. A collecting lens may be arranged between the body and the active amplifying medium, and another such lens may be located adjacent the end of the body remote from the active amplifying member. A semitransparent obliquely placed mirror may be provided between the totally reflecting prism and the body.

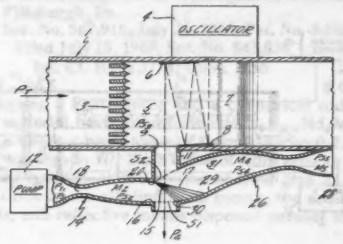
3,617,928

AERODYNAMIC WINDOW FOR GAS DYNAMIC LASER

George F. Hausmann, Glastonbury, Conn., assignor to United Aircraft Corporation, East Hartford, Conn.

Filed May 23, 1968, Ser. No. 731,658
Int. Cl. H01s 3/05
U.S. Cl. 331—94.5 5 Claims

A gas dynamic laser emits an output beam from a low-pressure region downstream of a nozzle section through which gases are expanded which contain the constituents necessary to obtain a lasing action. A gas dynamic laser employs the principles of kinetic relaxation of excited states of specific gas species to effect a population inversion of the excited states to obtain lasing action. An oscillator directs a low beam into said low-pressure lasing region, and through an optic arrangement the beam is amplified and directed out of an opening in the gas dynamic laser. Under normal circumstances the provision of such an opening would incur a flow of air from the ambient pressure to the low pressure within the laser cavity. The opening is connected to an aerodynamic window. The window has a passage leading from the low-pressure region of the gas dynamic laser in which pressures are set up permitting passage of the laser beam with no physical obstruction, yet prevent or minimize the flow of ambient air into the cavity.

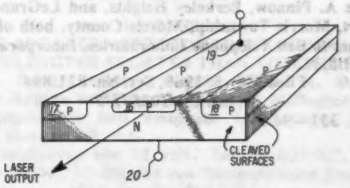


3,617,929

JUNCTION LASER DEVICES HAVING A MODE-SUPPRESSING REGION AND METHODS OF FABRICATION

Hans A. Strack, Richardson, and George D. Clark, Dallas, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 30, 1968, Ser. No. 787,760
Int. Cl. H01l 15/00
U.S. Cl. 331—94.5 4 Claims



A PN junction laser device having a central lasing region paralleled by P-type regions which serve to suppress transverse lasing modes is prepared from an N-type gallium arsenide crystal by the selective diffusion of zinc, employing a three-layer masking system. The first layer is phosphorous-doped SiO_2, substantially impermeable to zinc, patterned to preserve N-type conductivity between the mode-suppressing regions and the central P-type region. The second and third masking layers are SiO_2 patterned to reduce excessive build-dup of dopant concentrations at the semiconductor surface, and to control the diffusion rates so that the mode-suppressing regions are diffused deeper than the central P-type region.

3,617,930

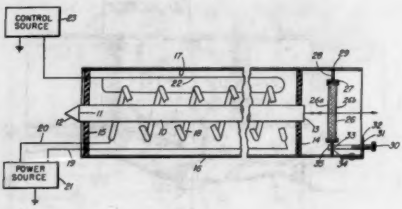
LASER STRUCTURE HAVING A CONTROLLABLE FREQUENCY SPECTRUM OF STIMULATED EMISSIVE ENERGY

Elias Snitzer, Wellesley; Frank W. Hoffman, Sturbridge, and Normand A. Guertin, Southbridge, all of Mass., assignors to American Optical Corporation, Southbridge, Mass.

Continuation-in-part of application Ser. No. 333,012, Dec. 12, 1963, now abandoned. This application Mar. 24, 1969, Ser. No. 814,505

Int. Cl. H01s 3/05

U.S. Cl. 331—94.5 9 Claims



An elongated laser element is provided with a light energy reflective termination at one end and its opposite end is optically ground and polished normal to the axis of the element to provide a Fresnel-reflective termination at such other end. The laser is adapted to emit stimulated emissive radiation exiting as a beam through its Fresnel-reflective end, and a laser-light transmissive member is supported axially of the element in the path of the emitted beam of light energy. This member has at least one pair of at least partially reflective surfaces which receive laser-light energy from the laser element and reflectively return laser-light energy The path or paths traversed through this member by laser light reflected by one or more reflective surfaces of the member has or have a length equal to an odd integral number of quarter wavelengths at the wavelength of at least one preselected laser-light energy returned by the transmissive member to the laser element substantially augments the stimulated emission by the element of laser-light energy at the wavelength of each such preselected frequency component.

3,617,931

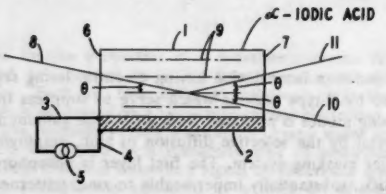
ACOUSTO-OPTIC DEVICES USING LEAD MOLYBDATE AND RELATED COMPOUNDS

Douglas A. Pinnow, Berkeley Heights, and LeGrand G. Van Uitert, Morris Township, Morris County, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 5, 1969, Ser. No. 821,894

Int. Cl. G02f 1/32

U.S. Cl. 331—94.5 11 Claims



Acousto-optic devices dependent for their operation on lead molybdate ($PbMoO_4$) and related compounds show efficiencies comparable to that of devices made from alpha-iodic acid and superior to that of devices constructed of earlier materials such as lithium niobate. Optical deflectors useful in modulators, switches and correlators are described.

3,617,932

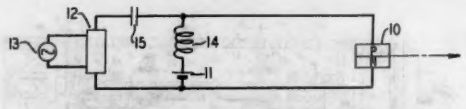
METHOD FOR PULSE-WIDTH-MODULATING SEMICONDUCTOR LASERS

Thomas L. Paoli, Chatham, and Jose' E. Ripper, North Plainfield, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 16, 1969, Ser. No. 833,366

Int. Cl. H01s 3/18

U.S. Cl. 331—94.5 8 Claims



The width of pulses in the output of a semiconductor laser exhibiting self-induced pulsing at a relatively constant repetition rate is modulated by applying to the laser a perturbation signal at a frequency that is related to the pulse repetition rate as the ratio of two integral numbers and amplitude modulating the signal.

3,617,933

METHOD FOR GENERATING OSCILLATION IN KRYPTON LASER

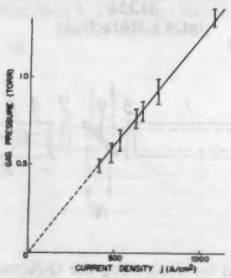
Manabu Yamamoto, Odawara-shi, Kanagawa-ken; Shunsuke Tomiyama, Kunitachi-shi, Tokyo-to; Akira Hashimoto, Kodaira-shi, Tokyo-to, and Susumu Saito, Hachioji-shi, Tokyo-to, all of Japan, assignors to Kabushiki Kaisha Hitachi Seisakusho, Tokyo-to, Japan

Filed June 17, 1969, Ser. No. 834,044

Claims priority, application Japan, June 21, 1969, 44/43292

Int. Cl. H01s 3/09

U.S. Cl. 331—94.5 3 Claims



Disclosed herein is a method for obtaining oscillation in krypton ion gas laser, wherein such oscillation is not subject to the phenomenon of instability which method is carried out by causing laser oscillation with high discharge current density in a capillary discharge tube filled with a discharge gas consisting principally of krypton, at a pressure which exceeds a predetermined value related to the discharge current density.

3,617,934

CONVERSION OF TANGENTIAL AND RADIAL POLARIZATION COMPONENTS TO RECTANGULAR COORDINATE COMPONENTS

Joseph P. Segre, 45 Quaboag Road, Acton, Mass.

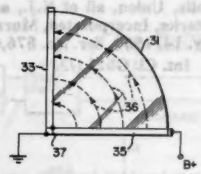
Filed Sept. 2, 1969, Ser. No. 854,704

Int. Cl. H01s 3/00

U.S. Cl. 331—94.5 8 Claims

An electro-optic crystal such as lithium niobate is formed into a half-wave plate to convert tangential and radial polarization components in a laser beam to rectangular coordinate components. To achieve this polarization conversion a transverse electric field is applied to the crystal in an uniform strength pattern such that the direction of the field varies with the angular position in the crystal changing at the same rate as the angular rate of change of position in the crystal.

Such polarization conversion devices are combined with a laser and in a laser cavity to limit laser oscillations in the



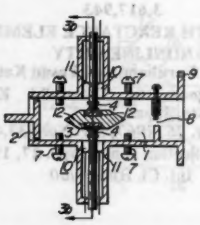
laser cavity to be either only tangentially polarized or only radially polarized.

3,617,935

SOLID-STATE OSCILLATOR

Katuhiro Kimura, Tokyo; Yoichi Kaneko, Kokubunji-shi, and Masao Kamimura, Kokubunji-shi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 14, 1969, Ser. No. 866,236
Claims priority, application Japan, Oct. 18, 1968, 43/75618
Int. Cl. H03b 7/06
U.S. Cl. 331—107 R 9 Claims



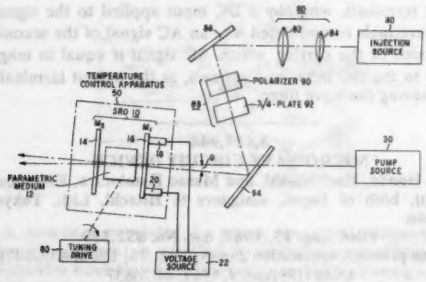
A high-power solid-state oscillator comprising a cavity resonator, a conductive plate positioned in said cavity resonator and in a plane perpendicular to the electric field in said cavity resonator and bisecting said cavity resonator, and at least two solid-state oscillating elements symmetrically positioned respectively on opposite surfaces of said conductive plate and positioned in a plane perpendicular to the axis of said cavity resonator.

3,617,936

FREQUENCY CONTROL OF A PULSED PARAMETRIC OSCILLATOR BY RADIATION INJECTION

John E. Bjorkholm, Middletown, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 26, 1969, Ser. No. 827,708
Int. Cl. H03f 7/00
U.S. Cl. 331—175 6 Claims



A singly resonant optical parametric oscillator (SRO) is pumped by a high power, pulsed source and is tuned approximately to a predetermined desired frequency. Radiation of that frequency is injected into a mode of the SRO from a stabilized, low-power injection source. The output of the SRO is a pulsed, high-power signal with frequency equal to the predetermined frequency to a high degree of accuracy.

3,617,937

LASER CONTAINING NEODYMIUM-DOPED CALCIUM FLUOROAPATITE LASER CRYSTAL

Robert Mazelsky, Monroeville, Pa., and Robert C. Ohlmann, Palo Alto, Calif., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Division of Ser. No. 567,918, July 26, 1966, Pat. No. 3,505,239.
Filed July 18, 1969, Ser. No. 843,036
Int. Cl. H01s 3/16; C09k 1/36
U.S. Cl. 331—94.5 8 Claims

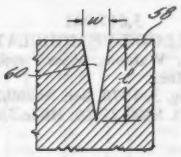
A laser having a light source and a cylindrical rod composed of a material having the formula $Ca_{5-x-y-w}Nd_xMn_yM_w(PO_4)_3F_{1-z}O_z$, where x has a value of from 0.001 to 0.2, y has a value of from zero to x, z has a value of from zero up to the limit of lattice stability, w has a value of from zero to x, and M is at least one of the alkaline earth metals, the rod having parallel ends, and reflective means disposed parallel to each end.

3,617,938

POLARIZING LASER MIRROR

Louis J. Denes, Monroeville, Pa., and Patrick C. Ward, South Windsor, Conn., assignors to United Aircraft Corporation, East Hartford, Conn.

Filed May 4, 1970, Ser. No. 34,234
Int. Cl. H01s 3/08
U.S. Cl. 331—94.5 5 Claims



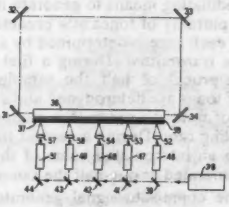
The surface of a laser mirror is formed with grooves to induce polarization of a laser energy incident therein, the plane of polarization being selective and reproducible. The dimensions and spacing of the grooves are a function of the wavelength of the laser energy.

3,617,939

PUMPING ARRANGEMENTS FOR LASERS OPERATING AT WAVELENGTHS SHORTER THAN VISIBLE LIGHT

Walter L. Bond, Berkeley Heights; Michel A. Duguay, Berkeley Heights, and Peter M. Rentzepis, Millington, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Original application Apr. 11, 1967, Ser. No. 629,937, now Patent No. 3,484,721. Divided and this application June 16, 1969, Ser. No. 847,770
Int. Cl. H01s 3/09
U.S. Cl. 331—94.5 7 Claims



A laser device for operation in the X-ray region comprises a resonator of three-dimensional polygonal shape having

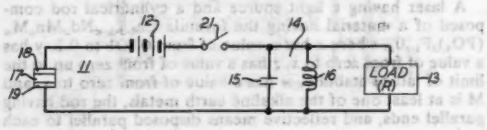
Bragg angle reflections at the apices of the polygon. The laser is pumped by removing electrons from the innermost shelfs of atoms of the active medium in synchronism with generation of X-rays traveling in the active medium. Pumping energy is achieved by collisions of relativistic particles and laser beams or by laser beam impingement on X-ray-emitting material.

3,617,940

LSA OSCILLATOR

John A. Copeland, III, North Plainfield, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 11, 1966, Ser. No. 564,081
Int. Cl. H03b 7/14
U.S. Cl. 331—107 G 9 Claims



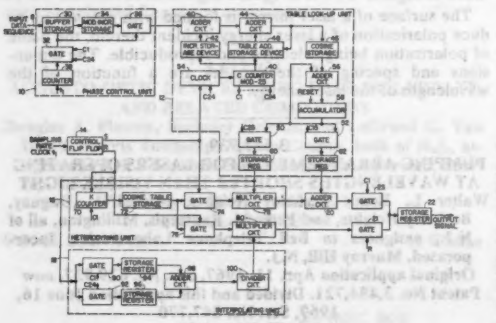
Under specified operating conditions a bulk semiconductor diode connected to an appropriate load through a resonant circuit will operate in a new oscillatory mode now generally designated the LSA mode (for Limited Space-Charge Accumulation). This mode is characterized by electric field excursions into the positive resistance region of the diode which are sufficient to preclude the formation of traveling electric field domains, and excursions into the negative resistance region which are sufficient to give a net gain.

3,617,941

TABLE LOOK-UP MODULATOR

Joseph DeLellis, Jr., Walpole, Mass., assignor to Sylvania Electric Products, Inc.

Filed Aug. 3, 1970, Ser. No. 60,274
Int. Cl. H04l 27/20; H03c 3/00
U.S. Cl. 332—16 R 4 Claims



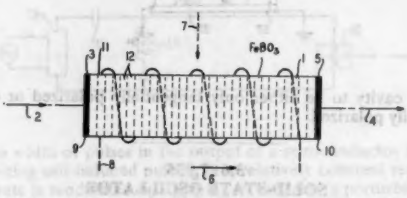
A table look-up modulator employs a phase control unit connected to a modulating means to generate in digital form a first and second plurality of tones at a predetermined baud rate. The phase of each tone is determined by a separate pair of input bits to be transmitted. During a first time interval (equal to the reciprocal of half the sampling rate), the second plurality of tones are heterodyned and combined with the first plurality of tones to generate a composite signal at one-half the sampling rate. During a second time interval, a signal representing an interpolated value of the second plurality of tones is generated at one-half the sampling rate. The combination of the composite signal generated during the first time interval and the signal representing the interpolated value generated during the second time interval is directed from the table look-up modulator at the sampling rate.

3,617,942

IRON BORATE ($FeBO_3$) DEVICES

Arjeh J. Kurtzig, Short Hills; Roy Conway LeCraw, Madison, and Raymond Wolfe, Union, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 14, 1969, Ser. No. 876,685
Int. Cl. G02f 1/22
U.S. Cl. 332—7.51 7 Claims



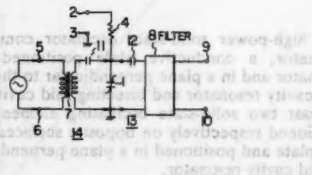
Iron borate ($FeBO_3$) evidences a magneto-optic effect of device interest over a broad frequency range including parts of the visible spectrum. Modulators and isolators, either continuous or pulsed, may be operated over this entire frequency range at room temperature.

3,617,943

MODULATOR WITH REACTANCE ELEMENT HAVING NONLINEARITY

Zenmon Abe; Yoshio Furuhata, and Yasuo Kato, all of Tokyo-to, Japan, assignors to Kabushiki Kaisha Hitachi Seisakusho, Tokyo-to, Japan

Filed Apr. 25, 1967, Ser. No. 633,497
Claims priority, application Japan, Apr. 27, 1966, 41/26310
Int. Cl. H03c 1/00
U.S. Cl. 332—52 5 Claims



A reactance element in which a ferromagnetic, ferroelectric, or antiferroelectric material having point-symmetry, saturated nonlinearity is interposed as a modulation element between signal input terminals and output terminals and provided with excitation signal input terminals for receiving a carrier and is caused to operate as it is maintained at a constant temperature in the vicinity of its Curie point, a wave filter being inserted between the reactance element and the output terminals, whereby a DC input applied to the signal input terminals is modulated into an AC signal of the second harmonics of the carrier, which AC signal is equal in magnitude to the DC input and appears, at the output terminals after leaving the wave filter.

3,617,944

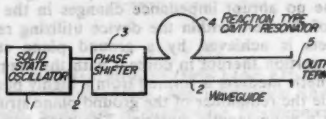
MICROWAVE CIRCUIT DEVICE

Akira Honda, Hachioji-shi, and Masao Kamimura, Kokubunji-shi, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 25, 1969, Ser. No. 852,589
Claims priority, application Japan, Aug. 26, 1968, 43/60478
43/60479; Apr. 9, 1969, 44/26837
Int. Cl. H03c 1/08
U.S. Cl. 332—56 6 Claims

A microwave circuit device composed principally of a solid state oscillator and a reaction type cavity resonator, con-

structed so as to develop a microwave output through a phase shifter and the above-mentioned reaction type cavity resonator at the output side of the above-mentioned solid



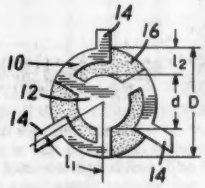
state oscillator, and adapted to develop an oscillation output or modulated signal output suppressing noise generated in the solid state oscillator.

3,617,945

STRIP LINE CIRCULATOR WHEREIN THE BRANCH ARMS HAVE PORTIONS EXTENDING IN A NONRADIAL DIRECTION

Shojiro Nakahara, and Nobutake Orime, both of Kamakura, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Chiyoda-ku, Tokyo, Japan

Filed Nov. 25, 1969, Ser. No. 879,760
Claims priority, application Japan, Nov. 28, 1968, 41/87184
Int. Cl. H01p *1/32, 5/12*
U.S. Cl. 333—1.1 **10 Claims**



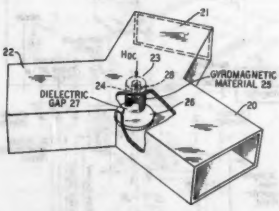
Branch lines radially extend from a circular junction of an intermediate conductor on a ferri-magnetic disc and include one portion running circumferentially of the disc. This causes an increase in area with which the disc overlaps the branch lines while the lines are maintained relatively small in radial length resulting in a small-sized circulator low in center frequency.

3,617,946

JUNCTION CIRCULATOR WHEREIN A CONDUCTIVE CORE EXTENDS WITHIN GYROMAGNETIC MATERIAL

Brian Owen, Allentown, Pa., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Feb. 2, 1970, Ser. No. 7,872
Int. Cl. H01p *1/32, 5/12*
U.S. Cl. 333—1.1 **6 Claims**



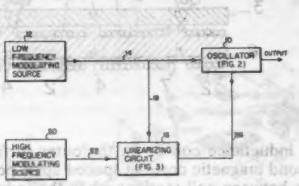
A junction circulator in which the usual magnetically biased ferrite post is modified by being separated from one conductive boundary by a dielectric gap and by having a conductive core extending axially therein from the other boundary. These modifications induce wave fields which simulate those of the turnstile circulator and produce a comparable broadband circulation.

3,617,947

WIDE BAND FREQUENCY MODULATOR

Garold K. Jensen, Pinecrest, Va., and James E. McGeogh, Silver Spring, Md.

Filed Oct. 29, 1964, Ser. No. 407,589
Int. Cl. H03c *3/08, 3/18, 3/22*
U.S. Cl. 332—18 **6 Claims**



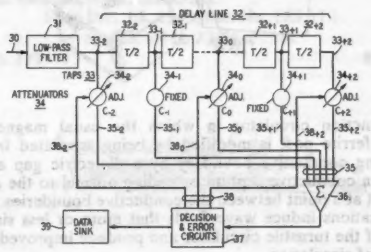
Variable frequency oscillator having a back-biased semiconductor element and controlled by low- and high-frequency input signals, either of which is capable of varying the oscillator frequency over a 2:1 range. Nonlinearity of oscillator compensated by linearizing circuit which includes compensating distortions in the form of nonlinear tubes and shunted diode, voltage divider circuit.

3,617,948

TRANSVERSAL EQUALIZER MODIFIED FOR SIGNAL FILTERING

Robert W. Lucky, Fair Haven, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sept. 17, 1969, Ser. No. 858,781
Int. Cl. H04b *3/04*
U.S. Cl. 333—18 **6 Claims**



The transversal equalizer with tap-spacing set for adaptive minimization of intersymbol interference in a synchronous digital data transmission system is modified to provide simultaneous shaping of the signal frequency spectrum. Adaptively variable tap gains for time domain equalization are augmented by fixed tap gains for frequency domain signal shaping. Signals from fixed and variable gain attenuators, relatively delayed by a fractional symbol interval with respect to each other, are combined to form optimized output signals. The respective fixed and variable gain contributions thus act substantially independently in accomplishing spectral shaping and intersymbol interference minimization due to their staggered relationships.

3,617,949

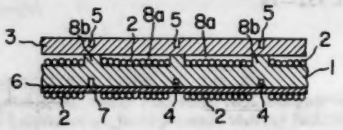
DELAY LINE

Kazuo Kameya, Yokohama-shi; Kanazu Taniguchi, Tokyo-to, and Osamu Isaka, Tokyo-to, all of Japan, assignors to Toko Kabushiki Kaisha, Ota-ku, Tokyo-to, Japan

Filed Dec. 19, 1969, Ser. No. 886,439
Claims priority, application Japan, Dec. 23, 1968, 43/94356
Jan. 22, 1969, 44/4546
Int. Cl. H03h *7/32*
U.S. Cl. 333—29 **12 Claims**

A delay line comprising a first magnetic core of planar type, an inductance coil wound along the length of the planar

magnetic core, a second magnetic core also of planar configuration applied on the first magnetic core in an overlying relationship, and several recessed portions provided either on the inner surfaces of said first and second magnetic cores facing the inductance coil or on the outer surfaces of the first and second magnetic cores at spaced apart positions or intermediate between coil sections when the inductance coil has been split into a number of coil sections.

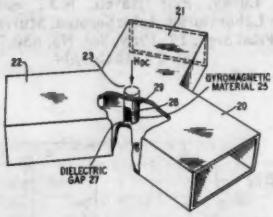


3,617,950

JUNCTION CIRCULATOR HAVING A CONDUCTIVE SEPTUM IN JUNCTION REGION

Clare Earl Barnes, Bethlehem, and Brian Owen, Allentown, both of, assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Feb. 2, 1970, Ser. No. 7,873
Int. Cl. H01p 1/32, 5/12
U.S. Cl. 333—1.1 **6 Claims**



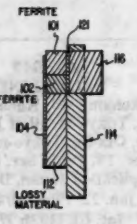
A junction circulator in which the usual magnetically biased ferrite post is modified by being separated from at least one conductive boundary by a dielectric gap and by having a conductive septum extending normal to the axis of the post at a point between the conductive boundaries. These modifications induce wave fields that more or less simulate those of the turnstile circulator and produce improved bandwidths of circulation.

3,617,951

BROADBAND CIRCULATOR OR ISOLATOR OF THE STRIP LINE OR MICROSTRIP TYPE

Ross Anderson, Campbell, Calif., assignor to Western Microwave Laboratories, Inc., Los Gatos, Calif.

Continuation-in-part of application Ser. No. 777,804, Nov. 21, 1968, now Patent No. 3,555,459. This application Nov. 7, 1969, Ser. No. 874,815
Int. Cl. H01p 1/32, 5/12
U.S. Cl. 333—1.1 **26 Claims**



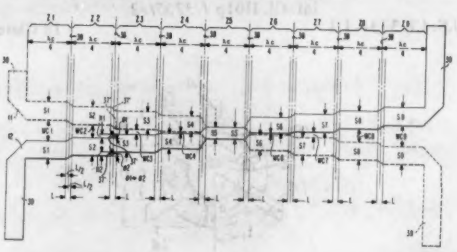
A microwave wide band circulator or isolator device of the strip line or microstrip type wherein the circuit is planar and has a plurality of outwardly tapering legs each of which constitutes a port. Ferrimagnetic or gyromagnetic material is provided overlying a substantial portion of the circuit including at least substantially all of the portion thereof functioning as the input and output ports of the device. The energy in the device propagates along the edges thereof, and accordingly the edges are designed to be free of abrupt changes in order that there be no abrupt impedance changes in the circuit. Uniformity of the field within the device utilizing relatively small magnets is achieved by a ground plane structure wherein the portion thereof in contact with the magnet and the gyromagnetic medium is formed from a highly permeable material while the remainder of the ground plane structure is formed from a nonmagnetic material. The peak power handling capability of the device may be increased by utilizing a gyromagnetic medium formed from two different materials chosen for respective optimum forward and reverse propagation characteristics, while the average power handling capability may be improved by means of a unique load structure.

3,617,952

STEPPED-IMPEDANCE DIRECTIONAL COUPLER

Elmer E. Beech, Apalachin, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 27, 1969, Ser. No. 854,360
Int. Cl. H01p 3/08, 5/14
U.S. Cl. 333—10 **8 Claims**



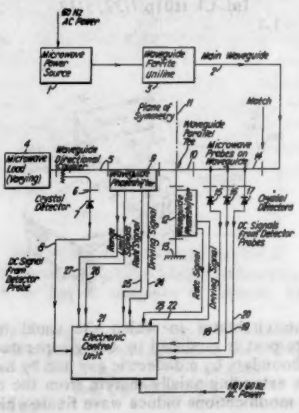
One or more transition regions of a microwave energy stepped-impedance directional coupling device, which has plural cascaded quarter-wavelength sections of parallel-coupled transmission lines, is or are provided with sloped edges. The sloped edges of a transition region are disposed in an oblique relationship with respect to each other.

3,617,953

MICROWAVE IMPEDANCE MATCHING SYSTEM

Ynte J. Kingma, and Jan Frederik Vaneldik, both of Edmonton, Alberta, Canada, assignors to Canadian Patents and Development Limited, Ottawa, Ontario, Canada

Filed Mar. 16, 1971, Ser. No. 19,949
Int. Cl. H01p 5/08; H03h 7/40
U.S. Cl. 333—17 **12 Claims**



An impedance matching device for automatically and continuously matching a time varying microwave load to a fixed frequency microwave power source and its output line.

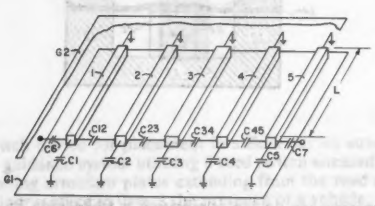
ERRATA

For Classes 33—24 and 333—202 see:
Patent Nos. 3,618,133 thru 3,618,135

3,617,954
SEMILUMPED COMB LINE FILTER

Ralph Levy, Newton, Mass., and John David Rhodes, Guisley, England, assignors to Microwave Development Laboratories, Inc., Needham Heights, Mass.

Filed May 8, 1970, Ser. No. 35,695
Int. Cl. H03h 7/10
U.S. Cl. 333—73 **3 Claims**

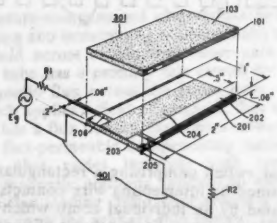


A band-pass filter for use in the VHF and UHF regions employs a digital line in which the length of the digits can be as short as one twelfth of the wavelength at the filter's midband frequency to permit the filter structure to be small compared to the wavelengths in the pass band while obtaining the advantage of the low loss of a digital line. The filter has an elliptic function and is particularly suitable for narrow band applications. The digital line is disposed between and spaced from a pair of ground plane plates and the line is formed by parallel digits which are short circuited at one end in the manner of a "comb" line. At the opposite end is a network of lumped element capacitors interconnecting adjacent digits of the line and coupling the end of each digit to ground.

3,617,955
TEMPERATURE COMPENSATED STRIPLINE FILTER

Joel C. Masland, Whippany, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 8, 1969, Ser. No. 814,248
Int. Cl. H03h 7/02; H05k 1/00
U.S. Cl. 333—73 S **9 Claims**

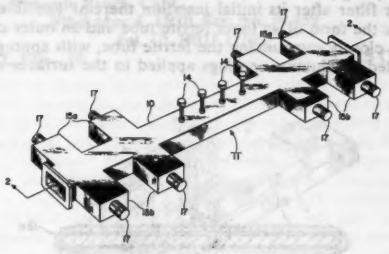


In a stripline filter that comprises a resonant length of stripline, the dielectric material is selected to have a dielectric constant with a negative temperature coefficient that is a direct function of the coefficient of linear thermal expansion of the stripline structure thereby substantially offsetting the frequency shifts caused by thermal expansion.

3,617,956
MICROWAVE WAVEGUIDE FILTER

Arvind R. Bastikar, Kanata, Ontario, Canada, assignor to Northern Electric Company Limited, Montreal, Quebec, Canada

Filed Jan. 26, 1970, Ser. No. 5,562
Int. Cl. H03j 3/26; H03h 7/10
U.S. Cl. 333—73 W **4 Claims**

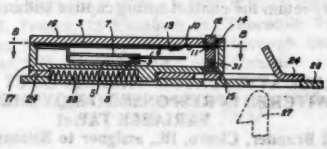


A complex waveguide filter which utilizes a number of conventional band-pass cavity resonators in conjunction with pairs of inductively coupled band-stop cavity resonators. The latter being inductively coupled to the waveguide to provide improved passband insertion loss and group delay characteristics.

3,617,957
LOCKING DEVICES FOR WASHING MACHINES OR ELECTROMECHANICAL APPLIANCES WITH BIMETALLIC ELEMENT

Norberto Brighenti, Naples, Italy, assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 12, 1968, Ser. No. 783,372
Int. Cl. H01h 27/06, 61/06
U.S. Cl. 337—77 **8 Claims**



A safety interlock for the door of electrical appliances such as washing machines comprises a thermostatic element heated by electrical power supplied to the appliance causing it to deflect. The deflection causes a locking member to slide into a mating aperture in a slide plate when the slide plate is biased into position by a hook on the appliance door. Once the locking member is in locking position, the door cannot be opened until the thermostatic element cools after deenergization. Means are provided for preventing excessive deformation of the thermostatic element and a shunt current path is provided to limit the amount of current passing through the thermostatic element and/or heater. Two forms of thermostatic elements and heaters therefor are disclosed.

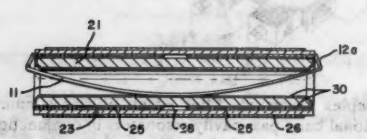
3,617,958
CONTACT SPRING

Ferdinand W. Schor, 3415 Rubio Crest Drive, Altadena, Calif., and Rolland R. Roup, 906 Story Place, Alhambra, Calif.

Filed Sept. 26, 1969, Ser. No. 861,299
Int. Cl. H03h 7/14
U.S. Cl. 333—79 **3 Claims**

A filter connector assembly is disclosed which features an electrically conductive contact spring composed of beryllium copper or the like material and having a thin, elongated, and curved central portion of uniform cross section together with

latching tabs or lugs at each end of the central portion. These latching tabs are integral with the central portion of the spring and assume a bent-up position so as to be substantially perpendicular to the plane of the corresponding end part. The connector assembly includes a tubular-shaped filter mounted in the assembly; a connector contact pin which is inserted in and may be removed from the central bore of the tubular filter and which may have an external lead connected thereto in any desired manner; and the aforementioned contact spring permanently retained or captivated within the tubular filter after its initial insertion therein. The filter itself takes the form of an inner ferrite tube and an outer ceramic tube closely surrounding the ferrite tube, with appropriately located conductive coatings applied to the surfaces of both



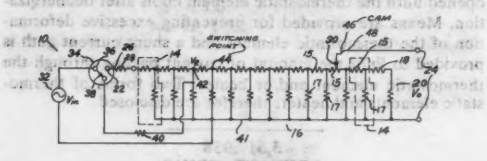
tubes. The filter may be of any desired type to give whatever filtering effect is required in a particular application, such as blocking interference signals, modifying pulse waveforms, establishing or changing passbands for applied signals, etc. The contact spring disclosed herein serves the dual functions of (a) making a stable and constant electrical contact between the conductive coating on the inner wall of the ferrite tube and the contact pin and (b) mechanically holding or securing the contact pin within the central bore of the ferrite tube. Another feature is that the latching tabs or lugs are so shaped and dimensioned as to fit within the ferrite tube bore with a clearance just sufficient to permit initial insertion of the contact spring, the latching tabs then serving to permanently retain the contact spring captive within the filter.

3,617,959

VARIABLE ATTENUATOR WHEREIN INPUT SIGNAL IS SWITCHED IN RESPONSE TO MOVEMENT OF VARIABLE TAP

Richard Brander, Cicero, Ill., assignor to Beltone Electronics Corp.

Filed May 27, 1970, Ser. No. 40,956
Int. Cl. H03h *7/26*
U.S. Cl 333—81 R **9 Claims**



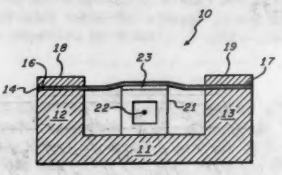
A ladder network having cascaded symmetrical resistor sections with a continuously variable output tap. A switch is provided at the input of the network to switch the input tap as a function of the attenuator setting to extend the attenuation range of a continuously variable attenuator. A bypass network functions to maintain the voltage at the output of the attenuator at a constant level when the input tap is switched.

3,617,960

WAVEGUIDE PARTIALLY FORMED OF A FLEXIBLE MEMBER FOR OBTAINING UNIFORM MINIMAL PRESSURE CONTACT WITH A LOAD THEREIN

Louis J. Lavedan, Jr., Clearwater, Fla., assignor to Sperry Rand Corporation, Great Neck, N.Y.

Filed Aug. 25, 1969, Ser. No. 852,845
Int. Cl. H01p *3/12, 1/30*
U.S. Cl. 333—95 R **7 Claims**



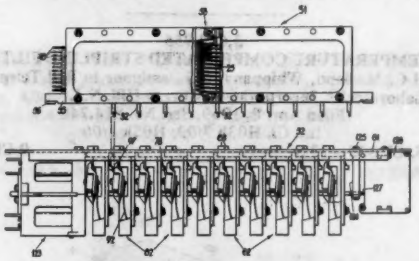
A microwave device comprising a waveguide having part of its periphery constructed of a flexible member held in contact at substantially zero pressure with a load positioned in the guide.

3,617,961

ELECTRIC CROSSBAR SWITCHES

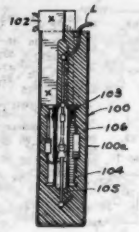
Gerald David Breeze, Coventry, England, assignor to The General Electric Company Limited, London, England

Filed Aug. 17, 1970, Ser. No. 064,239
Int. Cl. H01h *67/14*
U.S. Cl. 335—112 **5 Claims**



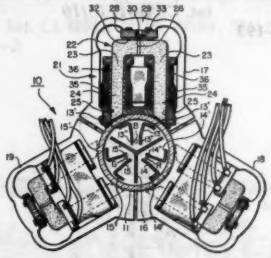
A crossbar switch comprising a rectangular array of contact sets formed by intersecting wire contacts. Each contact set is operated by an individual comb which is driven by a bridge magnet armature. Each column of contact sets has an associated bridge magnet. One contact set out of a column is selected for operation by selecting a particular 'select' bar, each row of contact sets having an associated select bar. A comb is only driven by a bridge armature when an 'interposer member' is interposed between the armature and the comb, which is otherwise inaccessible to the armature. The interposers are moved a row at a time by the select bars. The bridge armature does not drive the interposer directly but by way of a lost-motion coupling which permits the comb travel to be determined independently.

3,617,962
AUTOMATIC GUIDANCE SYSTEM FOR VEHICLES
Kenneth A. Wilson, Locust Valley, N.Y., assignor to American Chain & Cable Company, Inc., New York, N.Y.
Division of Ser. No. 680,182, Nov. 2, 1967, Pat. No. 3,512,601.
Filed Apr. 3, 1970, Ser. No. 25,344
Int. Cl. H01h *36/00, 51/28*
U.S. Cl. 335—151 7 Claims



A switch device for placement in a floor for an automatic vehicle guidance system utilizing a reed switch encased in the floor having armature plates extending from the reed switch to the floor surface to detect the presence of a vehicle.

3,617,963
TEMPERATURE-COMPENSATED STATIC CONVERGENCE APPARATUS
Raymond F. De Both, Broadview, Ill., and Albert M. Anthony, Conneaut, Ohio, assignors to Zenith Radio Corporation, Chicago, Ill.
Filed Jan. 2, 1970, Ser. No. 85
Int. Cl. H01f *3/12*
U.S. Cl. 335—211 3 Claims

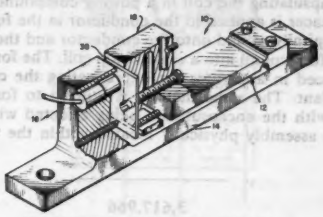


A temperature-compensated static convergence apparatus for establishing and maintaining a substantially constant magnetic flux field across an electron beam path in a tricolor cathode-ray tube has a primary flux circuit for directing the field of magnetic flux across the beam path. A permanent magnet, which applies a field of magnetic flux to the primary flux circuit, has a flux density that varies inversely with temperature. A flux-permeable compensating member, having a permeability that varies inversely with temperature, is disposed in magnetic coupling relation to the magnet and constitutes a flux loading circuit that diverts a portion of the magnetic flux from the primary flux circuit. The magnet and compensating member collectively establish, at a given temperature, a resultant magnetic flux field of predetermined strength across the electron beam path. Thus, a change in temperature that effects a change in the flux contribution of the magnet simultaneously alters the permeability of the compensating member so as to effect a substantially corresponding offsetting change in the loading effect of the compensator upon the field of the magnet, thereby maintaining the resultant flux field across the beam path at a predetermined strength.

ERRATA

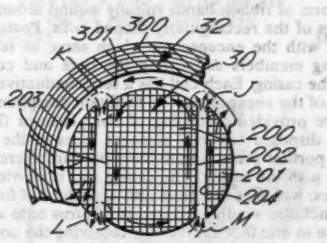
For Classes 335—212, 335—202 and 335—285 see: Patent Nos. 3,618,125, 3,618,136 and 3,618,137

3,617,964
LINEAR DISPLACEMENT AMPLIFICATION DEVICE AND DEFLECTION TRANSDUCER EMBODYING SAME
Ronald W. Bocksruker, Los Angeles, Calif., assignor to TRW Inc., Redondo Beach, Calif.
Filed May 4, 1970, Ser. No. 34,459
Int. Cl. H01f *21/02*
U.S. Cl. 336—30 5 Claims



A linear displacement amplification device having fulcrum means rockably engaging opposite sides of a lever in a common plane normal to the longitudinal axis of the lever and restrained against sliding movement along the lever, and means supporting one fulcrum, means for movement lengthwise of the lever relative to the other fulcrum means in response to a linear input displacement. This relative movement of the fulcrum means causes lateral displacement of one end of the lever proportional to but substantially greater than the input displacement. A deflection transducer embodying the linear displacement amplification device for producing an electrical output representing the amplified input displacement.

3,617,965
CORE ASSEMBLY FOR AN INDUCTIVE DEVICE
Anthony B. Trench, 25 Elizabeth St., Thornhill; Vaughan I. C. Marks, 56 Blakemanor Blvd., Scarborough, and William T. Arnold, R.R. #1, Queensville, all of Canada
Filed Apr. 9, 1969, Ser. No. 814,705
Claims priority, application Canada, Apr. 11, 1968, 017,329
Int. Cl. H01f *27/08, 27/24*
U.S. Cl. 336—61 12 Claims



A transformer of the shell type having two or more conductive coils physically in the form of closed loops and located side-by-side along a common axis with magnetizable material being provided by a ribbon of grain-oriented steel spirally wound around the legs of the coils to embrace the latter. The magnetizable material may be provided by concentric cylinders of spirally wound ribbon steel with adjacent spirals having the ribbons located substantially perpendicular to one another. A cylinder with the ribbon perpendicular to the axis of the cylinder may be formed of a grain-oriented steel in which case the ribbon is undulated, facilitating bending the same into a close spiral. The undulations are located

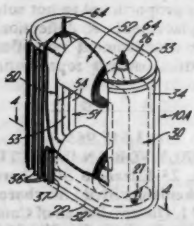
in internested relation reducing the likelihood of noise. The core and coil assembly is enclosed in a casing conforming substantially in shape to the outline configuration of the core and coil assembly and bushings are secured to the casing. Heat dissipation is facilitated by fins projecting outwardly from the casing and also by utilizing heat sinks having a portion located between the coils and a further portion projecting outwardly therefrom in direct physical contact with the casing. The heat sinks are preferably located so as not to intersect the high-density magnetic flux. The transformers may be constructed as identical units which may be stacked for increasing capacity and in which case the terminals are located electrically to interconnect adjacent units simultaneously with physically placing such units in stacked relation. A method of forming a coil is provided which includes simultaneously insulating the conductor turns one from the other and encapsulating the coil in a potting compound. To effect this, a spacer is applied to the conductor in the form of glass strands spirally wound onto the conductor and the conductor is thereafter wound into a closed loop coil. The formed coil is then placed in apparatus for impregnating the coil with an encapsulant. The same method is utilized to form a transformer with the encapsulation being effected with the core and coil assembly physically located within the transformer casing.

3,617,966

CORE AND COIL ASSEMBLY

Anthony B. Trench, 25 Elizabeth St., Thornhill, and Vaughan I. C. Marks, 56 Blakemanor Blvd., Scarborough, both of Canada

Filed Apr. 9, 1969, Ser. No. 814,733
Claims priority, application Canada, Apr. 11, 1968, 017327
Int. Cl. H01f *27/06*
U.S. Cl. 336—61 **7 Claims**



A shell core transformer having a core and coil assembly located in a casing with each coil being a separate element having a plurality of windings of conductor encapsulated in a potting compound. The coils are assembled in side-by-side relation and embraced by a magnetizable material preferably in the form of ribbon bands spirally wound around two or all four legs of the rectangularly shaped coils. Posts are formed integral with the encapsulant which serve as terminals and mounting members supporting the core and coil assembly within the casing. Each coil has a semiconductive film on the surface of the encapsulant. To facilitate dissipating heat, heat sinks are provided consisting of flat plates or fins having a portion disposed between adjacent faces of the coils and a further portion projecting radially outward therefrom and in contact with the casing. The casing also is provided, in some instances, with fins. There is also a method of forming a coil which includes winding a plurality of turns onto a disc having a groove in one face thereof for receiving the conductor and subsequently assembling further members to enclose the wound coil in a chamber for receiving an encapsulant.

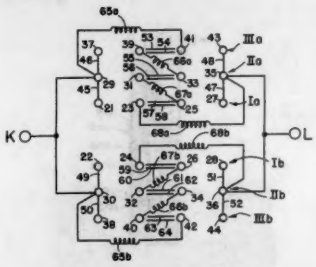
3,617,967

CURRENT TRANSFORMER HAVING PRIMARY SIDE SWITCHABLE TO DIFFERENT MEASURING RANGES

Werner Mitrach, Bamberg, Germany, assignor to Electromagnetic Industries, Inc., Clearwater, Fla.

Filed Apr. 14, 1970, Ser. No. 28,462
Int. Cl. H01f *21/00*
U.S. Cl. 336—147 **10 Claims**

A current transformer has a pair of input terminals and a primary side which is switchable to different measuring ranges, the current transformer having two or four primary winding sections whose ends are connected to switching terminals disposed in a transformer head having a pair of spaced partitions. By means of the switching terminals, two primary winding sections may be connected selectively either in parallel or in series, or four primary winding sections may be connectable selectively in parallel, series-parallel, or series.



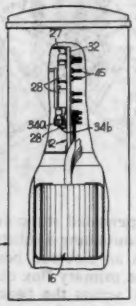
The switching terminals are arranged in pairs each including a first terminal and a second terminal, with the first terminals being arranged in one or more rows on one of the partitions and the second terminals being arranged in one or more rows on the other of the partitions. Each end of each winding section is connected to a respective one of the pairs of switching terminals, including a respective first and a respective second terminal.

3,617,968

CONNECTOR LEAD FOR ELECTRICAL APPARATUS AND COMBINATION THEREOF WITH SAID APPARATUS

Ralph D. Wakeam, Gadsden, Ala., and Edward Soref, Milwaukee, Wis., assignors to Allis-Chalmers Manufacturing Company, Milwaukee, Wis.

Filed Sept. 22, 1969, Ser. No. 859,932
Int. Cl. H01j *15/10*
U.S. Cl. 336—192 **23 Claims**



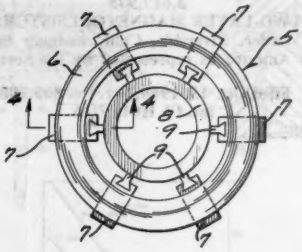
In combination with an electrical apparatus having an aluminum sheet winding, a multiple layer strip-type connector lead between the winding and a terminal spaced from the winding, and a method of making said connector lead. One end of the connector lead is mechanically and electrically secured to a convolution of the aluminum sheet winding by one or more pluglike welds, the connector lead being secured at the opposite end thereof to a terminal stud or studs. When the connector lead is of aluminum, it may be plated with tin or other suitable metal on at least the end thereof connected to the terminal stud or studs to prevent formation of an aluminum oxide coating on the portion of the connector lead which is so plated.

3,617,969

ADHESIVE AND METHOD OF APPLYING SAME

Frank W. Heinrichs, McMurray, Pa., assignor to McGraw Edison Company, Elgin, Ill.

Continuation-in-part of Ser. No. 601,292, Nov. 21, 1966
Filed July 28, 1969, Ser. No. 847,812
Int. Cl. H01f 27/30; B32b 27/30, 27/42
U.S. Cl. 336—199 10 Claims



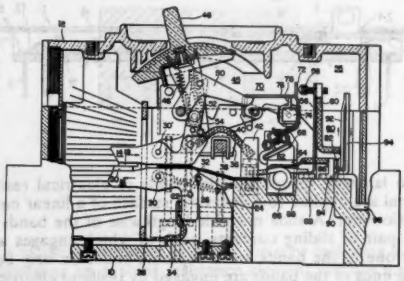
An adhesive is provided which includes polyvinyl butyral to improve the corona starting voltage characteristics of the adhesive. The adhesive is a mixture of a polyvinyl butyral varnish with an equal amount of phenolic resin varnish. The phenolic is a predominant ingredient by weight in the phenolic resin varnish but the polyvinyl butyral is not the predominant ingredient in the polyvinyl butyral varnish so that the resultant adhesive, although containing polyvinyl butyral, is predominantly phenolic.

3,617,970

DEVICE FOR PROTECTING THERMALLY RESPONSIVE ELEMENT OF CIRCUIT INTERRUPTER

Tutomu Hanafusa, Osaka, and Yoshio Kobayashi, Nara, both of Japan, assignors to Terasaki Denki Sangyo Kabushiki, Kaisha, Osaka, Japan

Continuation of application Ser. No. 690,234, Dec. 13, 1967, now abandoned. This application May 6, 1970, Ser. No. 37,369
Int. Cl. H01h 71/16, 73/54, 75/12
U.S. Cl. 337—3 2 Claims



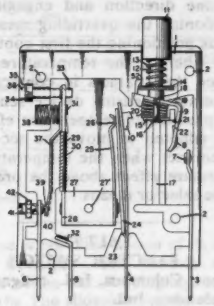
A protective device for protecting a thermally responsive element disposed in a circuit breaker comprising a movable contact carried by one end of a resilient conductor disposed in slightly spaced, parallel relation to a rigid conductor. The resilient conductor is connected at a point intermediate both ends to the bimetallic element through a flexible lead. A short circuit current flows in opposite directions through both parallel conductors to immediately generate an electromagnetic repulsion between them. This causes the movable contact to engage the associated stationary contact to complete a branch circuit around the bimetallic element to protect it from the short circuit current.

3,617,971

THERMAL SWITCH WITH A BIMETALLIC STRIP AND A HEAT STORAGE DEVICE

Jakob Ellenberger, Ernhofer Weg 2, Altdorf, near Nuernberg, Germany

Filed Nov. 5, 1969, Ser. No. 874,255
Claims priority, application Germany, Nov. 7, 1968, P 18 07 560.0
Int. Cl. H01h 61/013, 71/16, 73/30
U.S. Cl. 337—66 8 Claims



A thermal switch has a housing and a heat storage device having the shape of a parallelopipedic metal block swingably mounted by a pin in the housing. A bimetallic strip has an end fixed to the heat storage device on one side of its pin. A metal strip has an end fixed to the opposite side of the heat storage device. The metal strip carries electrical heating winding. A contact bridge is actuated by the bending of the bimetallic strip caused by the heating by the heat storage device.

ERRATUM

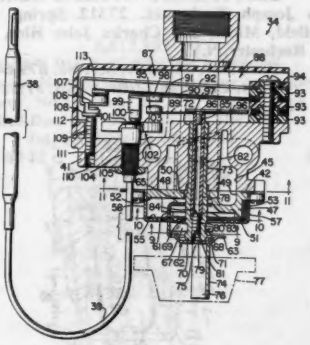
For Class 337—77 see:
Patent No. 3,617,957

3,617,972

FUEL CONTROL SYSTEM AND PARTS THEREFOR OR THE LIKE

Charles D. Branson, and Denis G. Wolfe, both of Greensburg, Pa., assignors to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 672,520, Oct. 3, 1967, Pat. No. 3,521,814.
Filed Dec. 9, 1969, Ser. No. 880,513
Int. Cl. H01h 37/26, 37/40
U.S. Cl. 337—323 10 Claims



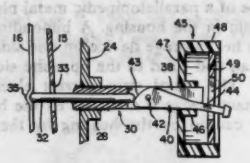
An electrical thermostat having a movable selector carried by the housing thereof. A temperature sensing device is car-

ried by the housing and has a movable part facing in one direction. A first spring blade is carried by the housing and has a first contact. A second spring blade is carried by the housing and has a second contact cooperable with the first contact. The second spring blade is normally being urged toward the first contact and engages the movable part of the temperature sensing device to follow movement thereof while the first spring blade is normally being urged toward the second contact. Means are carried by the housing for overriding the first spring blade to tend to move the first contact away from the second contact, the selector having a part facing in the one direction and engaging the overriding means for positioning the overriding means relative to the housing and thus positioning the first contact relative to the second contact whereby the temperature sensing device is adapted to place the contacts in contact with each other when the temperature sensing device senses a temperature effect below a preselected temperature effect setting of the selector and is adapted to move the second contact away from the first contact when the temperature-sensing device senses a temperature effect above the preselected temperature effect of the selector means.

3,617,973
ELECTRIC SWITCH

Amos E. Chesnut, Columbus, Ind., assignor to Arvin Industries, Inc., Columbus, Ind.

Filed June 19, 1970, Ser. No. 47,750
Int. Cl. H01h *37/18*
U.S. Cl. 337—375 **6 Claims**

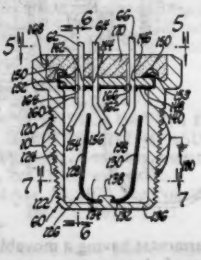


An electric switch in which a pair of blades having contacts thereon are mounted on a base. A bimetallic blade is also mounted on said base in engagement with one of said pair of blades to vary the position of their contacts with respect to each other in response to temperature changes. A sleeve adjustably carried in a rigid arm mounted on the base has a pin projecting therefrom for engagement with one of said pair of blades to vary the position of their contacts with respect to each other for controlling the temperature at which said bimetallic blade will effect contact opening and closing. Said pin is also movable with respect to the sleeve by a cam swingably mounted in said sleeve to vary the position of the contacts between an off position in which they are prevented from closing and an on position in which they are opened and closed under the action of the bimetallic blade.

3,617,974
ELECTRICAL SWITCHING MEANS

Aloysius Joseph Kochanski, 27312 Spring Arbor Drive, Southfield, Mich., and Charles John Hire, 6 Cranswick Lane, Rochester, N.Y.

Filed Nov. 25, 1969, Ser. No. 879,648
Int. Cl. H01h *37/04, 37/28, 37/52*
U.S. Cl. 337—380 **9 Claims**

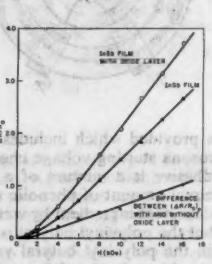


An electrical switching assembly has a temperature-responsive bimetal for completing an electrical circuit with a cooperating switch terminal member which can be variably positioned in order to achieve the making and breaking of a related circuit at a predetermined temperature. Modifications of such a switch assembly include the provision of controlled hysteresis within the bimetal in order to result in the making of the circuit therethrough to occur at an environmental temperature different from the environmental temperature at which the circuit therethrough is opened.

3,617,975
TWO-LAYER MAGNETORESISTORS

Harry H. Wieder, Riverside, Calif., assignor to the United States of America as represented by the Secretary of the Navy

Filed Oct. 13, 1969, Ser. No. 865,708
Int. Cl. H01c *7/16*
U.S. Cl. 338—32 **9 Claims**

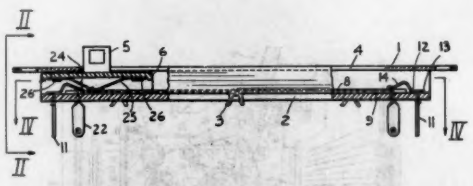


Thin film and bulk magnetoresistors having sensitivity improved by a factor greater than two by coating the magnetoresistor element with a thin conductive layer which short circuits the Hall effect in the semiconducting material.

3,617,976
DOUBLE PATH LINEAR MOTION POTENTIOMETER

Dudley H. Campbell, Raleigh, N.C., assignor to Stackpole Components Company, Raleigh, N.C.

Filed Feb. 8, 1968, Ser. No. 704,005
Int. Cl. H01c *5/02*
U.S. Cl. 338—133 **5 Claims**



Two laterally spaced parallel bands of electrical resistive material are applied to a dielectric surface of a linear motion potentiometer. A slide movable lengthwise of the bands carries a pair of sliding contacts, each of which engages a different one of the bands and a separate collector strip beside it. The ends of the bands are engaged by resilient electric terminals.

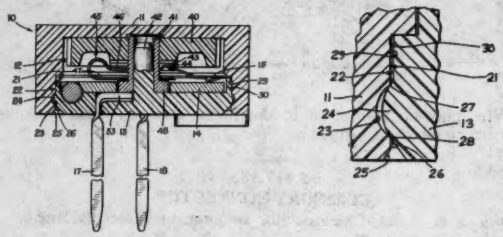
3,617,977
ELECTRICAL DEVICE HAVING SNAP TOGETHER HOUSING PARTS

Adolf K. Scheiterbauer, Munich, and Helmut Stickdorn, Neubiberg Bavaria, both of Germany, assignors to The Bunker-Ramo Corporation, Oak Brook, Ill.

Filed Sept. 5, 1969, Ser. No. 855,506
Int. Cl. H01c *9/02, 5/02*
U.S. Cl. 338—164 **11 Claims**

Electrical device having snap together housing parts, one part having a cylindrical outside surface formed with an annular projection to snap into an annular groove of a cylindrical inside surface of the other part. The projection and the groove have rounded cross-sectional shapes and the radius of

curvature of the projection is greater than that of the groove, providing restricted areas interengaged with a high unit pressure to provide an effective seal. Impedance means are provided on one part in the form of an annular resistance element engaged by a wiper contact rotatable about the axis of the cylindrical surfaces and connected to a worm gear which is engaged by a wiper contact on the other part when the parts are assembled.

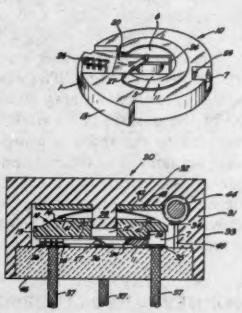


3,617,978

ROTOR AND CONTACT ASSEMBLY FOR VARIABLE RESISTANCE DEVICE

George A. Gerstmeier, Santa Ana, Calif., assignor to Beckman Instruments, Inc.

Filed Mar. 12, 1970, Ser. No. 18,835
Int. Cl. H01c 9/02
U.S. Cl. 338—174 11 Claims



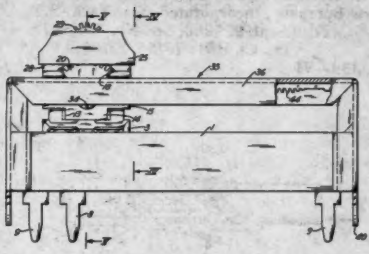
In a variable resistance device of the type including a housing enclosing an annular resistance element, a rotor member mounted within the housing, an electrically conductive wiper contact attached to the rotor member for rotation therewith, the wiper contact having a resilient wiper arm extending into electrically conductive engagement with the resistance element, and drive means for rotating the rotor member, the improvement wherein the rotor member includes a pocketlike slot therein, and wherein the wiper contact includes a substantially planar section, the width of at least a portion of which is slightly greater than the width of the slot, the planar section extending into the slot thereby forming an interference fit therewith. The wiper contact includes an upended tab which abuts against a wall of the rotor member to accurately locate the contact relative to the rotor member. A tab on the wiper contact extends through a further slot in the rotor member into a cavity therein. By bending the tab down into the cavity, the contact is securely locked in place.

3,617,979

LINEAR MOTION POTENTIOMETER WITH GEARS AND RACK

Harold L. Purdy, St. Marys, Pa., assignor to Stackpole Carbon Company, St. Marys, Pa.

Filed Oct. 5, 1970, Ser. No. 77,921
Int. Cl. H01c 9/02
U.S. Cl. 338—183 13 Claims



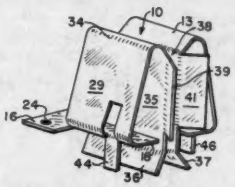
An elongated case is provided in one of its sidewalls with a longitudinal slot, through which extends slidable means movable lengthwise of the slot. A bridging contact inside the case is carried by the The slideable means also means in engagement with resistance and collector elements. The slideable means also carry a large gear that rotates a pinion. An exposed manually rotatable small gear meshes with the large gear and is likewise carried by the slidable means. Rack teeth extend along the case and engage the pinion so that when the small gear is turned by hand the slidable means will be moved lengthwise of the case to adjust the potentiometer.

3,617,980

PRINTED CIRCUIT BOARD CONNECTOR CLIP

John C. Alkire, Santa Ana, and Donn G. Nelson, Orange, both of Calif., assignors to Anaconda Wire and Cable Company

Filed June 18, 1970, Ser. No. 47,498
Int. Cl. H01r 27/02
U.S. Cl. 339—32 R 8 Claims



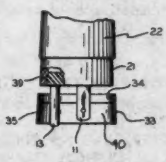
A clip is described that can be folded from a single sheet metal stamping and which, when fastened to a printed circuit board, will accept and grip connector pins from above, below, or across the board.

3,617,981

HEAVY DUTY ELECTRICAL PLUG

David E. Kramer, Northbrook, Ill., assignor to Daniel Woodhead Company, Northbrook, Ill.

Filed Dec. 15, 1969, Ser. No. 884,981
Int. Cl. H01r 15/06, 33/06
U.S. Cl. 339—63 M 3 Claims



Heavy-duty electrical plug having a tubular elastomeric body portion, a disc tightly seated in one end thereof, a plurality of male thermal contacts mounted in the disc, a sub-

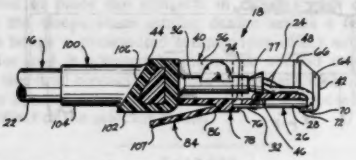
stantially rigid ring fixed tightly about said end of the body portion, a threaded nipple mounted in the other end of the body portion, a tapered elastomer grommet seated in the nipple, and a cord grip nut threaded on the nipple.

3,617,982

DEVICE FOR MAKING AN ELECTRICAL CONNECTION

Edwin C. Hardesty, Perry Hall, Md., assignor to Western Electric Company, Incorporated, New York, N.Y.

Filed Sept. 9, 1968, Ser. No. 758,502
Int. Cl. H01r *13/56, 23/04*
U.S. Cl. 339—91 9 Claims



A plug is provided wherein substantially straight terminals can be attached to flexible conductors, and the straight terminals can be inserted into a molded dielectric body of the plug with substantial ease from a high-volume manufacturing point of view. The body of the plug is molded together integrally so that it can be handled as a one-piece structure when it is being assembled with the terminals.

3,617,983

TERMINAL JUNCTION INTERCONNECTION SYSTEM

George Allen Patton, Pfafftown, N.C., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of application Ser. No. 724,346, Apr. 26, 1968, now abandoned. This application Mar. 7, 1969, Ser. No. 805,160
Int. Cl. H01r *9/08*
U.S. Cl. 339—98 10 Claims

Terminal device for a wire comprises a section of metal strip bent 180° intermediate its end to form two plate sections connected by a bight. A slot extends into the bight and partially into the plate sections. Wire is forced into the slot and electrically contacted by edges of the slot in each plate section. Modified version has a third plate section integral with other two plate sections. Third plate section may be slotted or unslotted; if unslotted, the third plate section functions as a wire trimming means in cooperation with an insertion tool. Housings and mounting means of various types for terminals are also disclosed to hold a plurality of terminals.

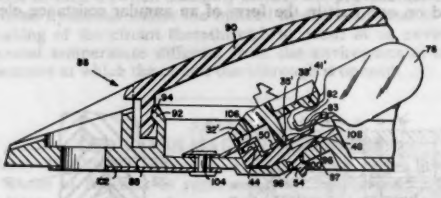
3,617,984

SOCKET FOR ELECTRIC LIGHT BULBS

Robert R. Rossi, Audubon, N.J., assignor to Arrow-Safety Device Company, Mt. Holly, N.J.

Filed Oct. 1, 1969, Ser. No. 862,651
Int. Cl. H01r *13/48*
U.S. Cl. 339—61 L 5 Claims

A molded plastic socket for special bulbs of the type having a glass base around which are bent loops of wire comprises a pair of identical molded plastic elements arranged to interlock with each other. A flexible plastic arm forming part of each of the two socket members cooperates with a metal clip mounted in the opposite socket member to hold the bulb in place and to deliver electric current to operate the bulb.



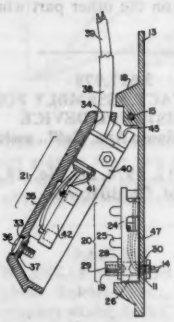
Wire may be connected to the metal clips by insulation-piercing elements formed in clips.

3,617,985

ACCESSORY CONNECTOR

Joseph D. Kehl, Chicago, Ill., assignor to Motorola, Inc., Franklin Park, Ill.

Filed Oct. 24, 1969, Ser. No. 869,171
Int. Cl. H01r *13/54*
U.S. Cl. 339—92 M 6 Claims



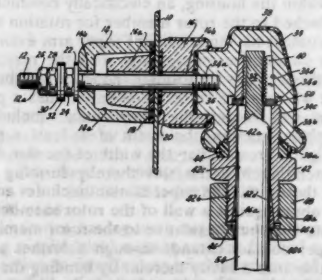
An accessory connector for attaching an external control device to a portable two-way radio. The connector consists of two portions; the first portion being secured to the radio housing in place of the push-to-talk switch, and the second portion being secured to the radio housing in place of the push-to-talk switch actuator. The two portions, when coupled together, provide an electrical and mechanical connection between the external operating device and the two-way radio thereby allowing remote operation in place of operation from the push-to-talk switch.

3,617,986

TRANSFORMER TAP FOR UNDERGROUND APPLICATIONS

Stephen P. Becker, and Henry R. Wengen, both of Poughkeepsie, N.Y., assignors to Fargo Mfg. Company, Inc., Poughkeepsie, N.Y.

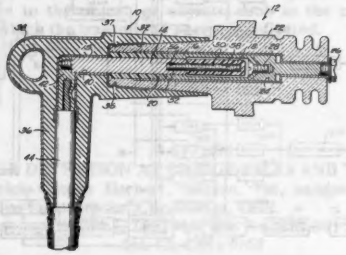
Filed Mar. 6, 1969, Ser. No. 804,912
Int. Cl. H01r *13/52*
U.S. Cl. 339—94 A 1 Claim



A rugged and compact connector or tap to a transformer or other encased electrical component for direct burial appli-

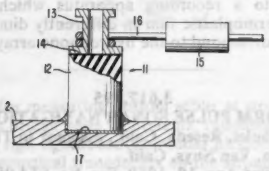
cations providing permanent, watertight, insulated junction including internal and external attachment means and external insulation means.

3,617,987
MAGNETIC SAFE BREAK TERMINATOR ARC SUPPRESSOR
Edward L. Sankey, New Berlin, Wis., assignor to RTE Corporation, Waukesha, Wis.
Filed Mar. 10, 1969, Ser. No. 805,435
Int. Cl. H01r 13/52
U.S. Cl. 339—111 6 Claims



An electrical connector including a plug having a member of arc-extinguishing material connected to an electrically conductive male element by a ferromagnetic stud and a receptacle having a sleeve of arc-extinguishing material connected to a hollow electrically conductive female element.

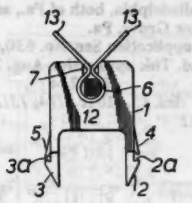
3,617,988
INSULATIVE ELECTRICAL TERMINAL
Curtis Eugene Ward, 11486 Miller Ave., Los Altos, Calif.
Filed Aug. 11, 1969, Ser. No. 848,985
Int. Cl. H01r 9/06
U.S. Cl. 339—112 4 Claims



An insulative electrical terminal is disclosed. The terminal includes a ceramic body metallized on one end which is brazed to a terminal post structure to which an electrical circuit component is to be soldered. The other end of the ceramic insulator body is affixed to a metallic chassis via a thermally conductive adhesive which preferably forms a fillet between the insulator body and a pocket formed in the metallic chassis member.

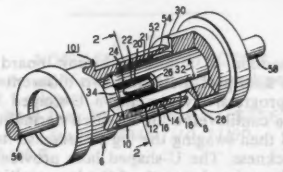
3,617,989
ELECTRICAL CONNECTOR
Clarence Willans Heath, Sycamore House, Bleasby, Nottinghamshire, England
Filed Feb. 19, 1968, Ser. No. 706,549
Claims priority, application Great Britain, Feb. 24, 1967, 8872/67
Int. Cl. H01r 9/12, 9/16
U.S. Cl. 339—198 3 Claims

An electrical connector comprises a body of insulating material having a channel-shaped recess in which a contact strip is assembled. The strip has an arcuate-shaped base nested in the recess which is of corresponding shape and a plurality of contact fingers for attachment to lead wires. A metal terminal block for connection to a main supply, extends transversely of said recess and is engaged by the contact strip. The connector is formed with resilient legs for



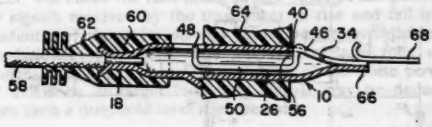
snapping into an aperture in a support on which the connector is to be mounted.

3,617,990
COAXIAL CONNECTOR
Roger J. Colardeau, Florham Park, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Dec. 1, 1969, Ser. No. 881,008
Int. Cl. H01r 17/06, 11/22
U.S. Cl. 339—177 E 2 Claims



A coaxial connector has solid conductive sleeves surrounding both the inner and outer conductor contacts to reduce RF leakage and degradation caused by mechanical discontinuities. The connector has all contacts in one half of the connector and very low insertion forces are sufficient to achieve good electrical contact.

3,617,991
ONE-PIECE CONNECTOR INCLUDING RELEASE MEANS
Bernard Edward Shlesinger, Jr., Annandale, Va., assignor to AMP Incorporated, Harrisburg, Pa.
Filed July 19, 1967, Ser. No. 654,504
Int. Cl. H01r 9/16
U.S. Cl. 339—217 J 47 Claims

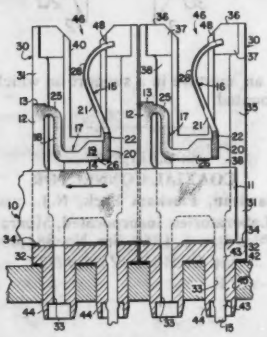


A one piece plug connector comprising a front portion, an intermediate portion and a rear portion and said plug connector having an integral locking member comprising a detect and a release member; an opening in the front portion for the detent and an opening in the rear portion for a release member; and said plug connector being formed from a one piece blank of material having a detent cutout on the front portion and the locking member extending along one side and parallel to that side edge of the blank.

3,617,992
SWAGED CARD-EDGE CONTACT AND BUS STRIP WITH INTEGRAL CONTACTS

Herbert E. Ruehlemann, Huntingdon Valley, and Peter Slobodzian, Philadelphia, both of Pa., assignors to Elco Corporation, Willow Grove, Pa.

Continuation of application Ser. No. 630,612, Apr. 13, 1967, now abandoned. This application Aug. 26, 1968, Ser. No. 757,214
Int. Cl. H01r 9/14, 13/26
U.S. Cl. 339—242 11 Claims

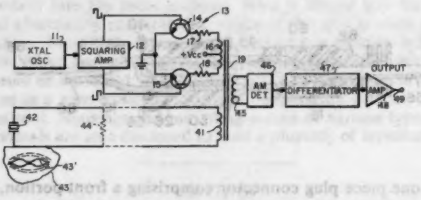


The nose section of a printed circuit board connector stamped from a strip of metal has two different thicknesses achieved by progressively piercing a U-shaped hole in the strip to form a cantilevered lug oriented normal to the grain direction, and then swaging the lug to increase its width and reduce its thickness. The U-shaped hole provides clearance for the two dimensional growth of the lug resulting from the swaging operation without affecting the remainder of the strip which is then progressively pierced to form a cantilevered ear oriented in a direction parallel to the grain with the swaged lug supported on the free end of the ear. The cantilevered ear is then progressively bent along the line perpendicular to the grain to turn the lug so that it defines a surface perpendicular to the ear, thus establishing the wiping finger of the contact.

3,617,993
CW DOPPLER TRANSCEIVER SYSTEM

Harold Lee Massie, Trenton, and Bruce Elson Mount, Wayne, both of N.J., assignors to Hoffmann La Roche Inc., Nutley, N.J.

Continuation-in-part of application Ser. No. 830,681, June 5, 1969, now abandoned. This application Sept. 10, 1969, Ser. No. 856,759
Int. Cl. G01s 9/66
U.S. Cl. 340—1 R 10 Claims

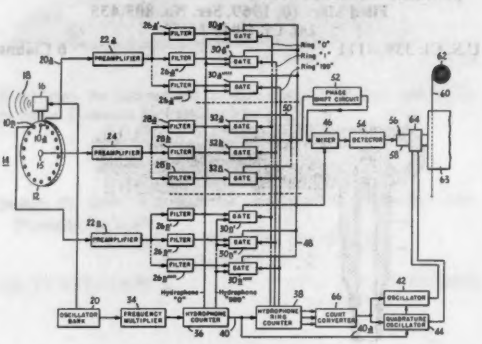


A transceiver system for processing a Doppler signal, utilizing a common transmit-receive transducer driven by a high-frequency RF-square wave amplitude limited signal for eliminating AM transmitter noise, and a receiver for amplitude-demodulating the received RF output of the transducer to provide a Doppler frequency output.

3,617,994
SONOGRAPHY SYSTEM

William E. Glenn, Jr., 140 Bentwood Drive, and Frank B. Gorman, 276 East Hunting Ridge Road, both of Stamford, Conn.

Filed Jan. 28, 1969, Ser. No. 794,560
Int. Cl. G01s 9/66
U.S. Cl. 340—3 15 Claims

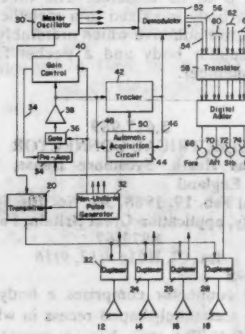


As described herein, an object field is simultaneously illuminated by acoustic waves having different frequencies and the waves reflected off objects in the field are recorded by a plurality of hydrophones arranged in a circular array and supplied as voltage signals to a plurality of tuned circuits. The tuned circuits separate the different frequency components of the developed signals and supply the component signals, either sequentially through a scanning network to a mixer circuit wherein the component signals are combined with a reference signal having frequencies equal to the frequencies of the separated component signals and selectively out-of-phase therewith, or to a plurality of mixer circuits wherein the component signals are combined with reference signals having frequencies equal to the frequencies of the separated component signals and selectively out-of-phase therewith. The combined signals are then supplied sequentially to a recording apparatus which records the signals on thermoplastic film in differently dimensioned patterns which correspond to the hydrophone array.

3,617,995
NONUNIFORM PULSE SONAR NAVIGATION SYSTEM

Thomas A. Goulet, Reseda, Calif., assignor to The Marquardt Corporation, Van Nuys, Calif.

Filed Apr. 10, 1969, Ser. No. 814,987
Int. Cl. G01s 9/66
U.S. Cl. 340—3 R 10 Claims



A nonuniform pulse sonar system employing Doppler information for navigational purposes is disclosed. A train of

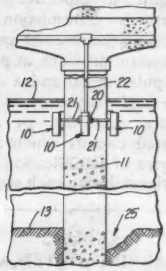
pulses including a plurality of energy pulses having varying predetermined widths and spacing is provided by a nonuniform pulse generator to energize a transducer which serves as a projector adapted to transmit acoustical energy into a body of water. Reflected energy is sensed by the transducer, which also serves as a hydrophone, and subsequently processed by a tracker which selects and reproduces, as a continuous frequency signal, the predominant frequency in the frequency spectrum of the reflected energy detected. A demodulator unit is employed to compare the continuous frequency signal with the frequency of the energy pulses used to energize the transducer, the frequency difference constituting a Doppler frequency that is proportional to the velocity of a craft, on which the sonar system is mounted, relative to the object, or objects, such as the ocean floor, from which the transmitted energy is reflected.

3,617,996

SCOUR DETECTION AT BRIDGE PIERS AND THE LIKE

Frederick George Herbert, Oakton, Va., assignor to Data-Design Laboratories, Cucamonga, Calif.

Filed Nov. 24, 1969, Ser. No. 879,301
Int. Cl. G01s 9/68
U.S. Cl. 340—3 R 8 Claims



Apparatus for measuring bottom scour at structures in the water, such as bridge piers, abutments, retaining walls, dams, locks, drilling rigs, lighthouses and radar platforms, A plurality of electroacoustical transducers on the structure at spaced locations and directed toward the bottom, with means for periodically energizing a transducer at each location and means for determining transit times to the bottom and return. The transit times can be viewed, recorded and compared, with differences in transit times providing a measure of scour at the bottom.

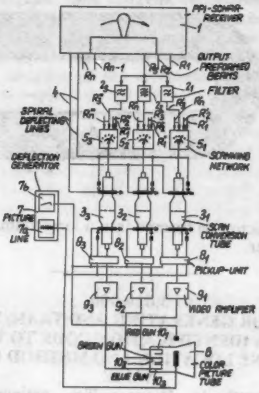
3,617,997

DISPLAY DEVICE FOR TARGET POSITION-FINDING APPARATUS

Heinrich Maass, Bremen St. Magnus, and Reinhard Wilhelm Leisterer, Bremen, both of Germany, assignors to Fried Krupp Gesellschaft mit beschrankter, Haftung, Essen, Germany

Continuation of application Ser. No. 775,477, Nov. 13, 1968, now abandoned. This application Dec. 29, 1969, Ser. No. 888,510
Int. Cl. G01s 9/66
U.S. Cl. 340—3 R 5 Claims

A display device for target position-finding apparatus of the type employing echo signals, which displays a true map-scale image of targets on a cathode ray tube screen. According to the invention, a color picture tube is used as the cathode-ray tube and its three color guns are respectively



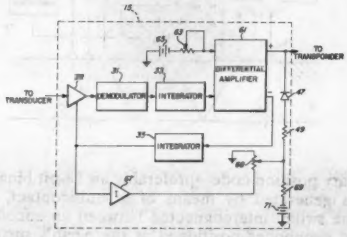
supplied with the echo signals from radially stationary, advancing and receding targets.

3,617,998

NOISE SIGNAL DETECTOR

Nathan Freedman, West Newton, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed June 30, 1969, Ser. No. 837,630
Int. Cl. H04b 1/10, 11/00
U.S. Cl. 340—5 R 7 Claims



A receiver for use in a system in which randomly varying target-indicating signals from a transducer are detected in the presence of noise signals which may vary in amplitude between wide limits. Advantage is taken of the fact that a moving target, upon passing through the field of a transducer, will cause the root mean square value of the power of the signals received by the transducer to rise and fall independently of the noise power. Therefore, by establishing a threshold level for detection which rises and falls with changes in the root mean square value of the noise power, the existence of target indicating signals may be deduced when such a threshold level is exceeded.

3,617,999

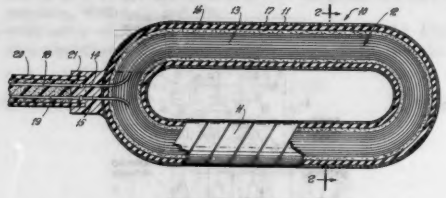
INTERNAL COIL MAGNETOSTRICTIVE TRANSDUCER

David E. Parker, Pawcatuck, and Thomas L. Beaudoin, Mystic, both of Conn., assignors to The United States of America as represented by the Secretary of the Navy

Filed Aug. 21, 1969, Ser. No. 851,965
Int. Cl. H04r 15/00
U.S. Cl. 340—11 4 Claims

An acoustic waterproof transducer of a thin magnetostrictive strip formed into a closed loop and having a pressure release material against one surface thereof. An electrically

conducting wire is continuously loop wound within said closed loop transversely and disposed in a waterproof jacket.



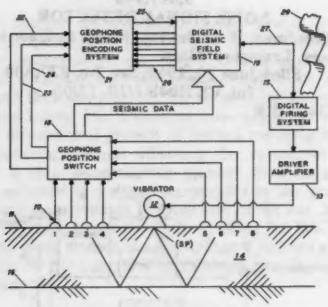
The entire structure is formed into a longitudinally extending loop transducer.

3,618,000

SYSTEM FOR GENERATING AND TRANSMITTING A POSITION IDENTIFICATION CODE TO IDENTIFY GEOPHONE LOCATION AND METHOD OF USING SAME

Henry T. Carruth, Jr., Houston, Tex., assignor to Chevron Research Company, San Francisco, Calif.

Filed Nov. 6, 1969, Ser. No. 874,668
Int. Cl. G01v *1/00*
U.S. Cl. 340—15.5 DP **15 Claims**



A binary position code—preferably an 18-bit binary digital code—is generated by means of a multicontact, compact geophone switch interconnected between an encoder and a series of geophones positioned at the earth's surface. In a preferred embodiment, a 7-bit subcode identifies the marker position of at least one lead or marker geophone of the series of geophones; while two 5-bit subcodes identify the gap spacing between two subsets of geophones, if any, should the seismic prospecting crew employ split spread shooting techniques. (In split spread shooting, two groups of geophones are separated by an in-line distance centered at the location of the energy source.) The 18 bits of information are then combined with three bits of control data. The result—a 21-bit digital word—is then recorded on magnetic tape on the header section as header information. To indicate gap spacing, the tape can be processed in a manner directing the subtraction of one 5-bit code from the other 5-bit code, the difference appearing in decimal notation on the data printout.

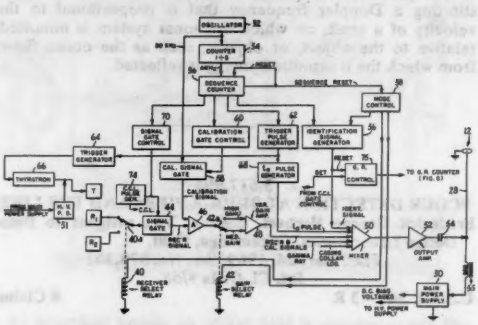
3,618,001

DOWNHOLE ACOUSTIC LOGGING CONTROL SYSTEM

Fred W. Zill, Houston, and Frank P. Kokesh, Clear Lake, both of Tex., assignors to Schlumberger Technology Corporation, New York, N.Y.

Filed Mar. 25, 1968, Ser. No. 715,667
Int. Cl. G01v *1/40*
U.S. Cl. 340—18 CM **6 Claims**

Apparatus for acoustically logging a borehole to obtain indications of the effectiveness of the cement between a casing and a borehole to prevent fluid communication, characterized by a downhole digital control system for repetitively energizing an acoustic transmitter and selectively coupling electrical signals developed by the receivers upon receiving transmitted acoustic energy to a signal channel. The signal channel is arranged to provide at least two degrees of amplification of the electrical signals in a sequence synchronized with the transmissions of acoustic energy from the transmitter. In a predetermined order, electrical signals from each receiver corresponding to different acoustic transmissions will be amplified to respective different degrees and coupled to a conductor for transmission to the surface. For the purpose of identifying the receiver and degree of amplification selected, the system provides, at preselected intervals, both an identifying pulse signal and a calibration signal of reference amplitude and frequency. All functions of the downhole system are controlled by a digital sequence counter and associated circuits which automatically select the receiver, the degree of amplification and relative time of occurrence of each signal during each sequence.

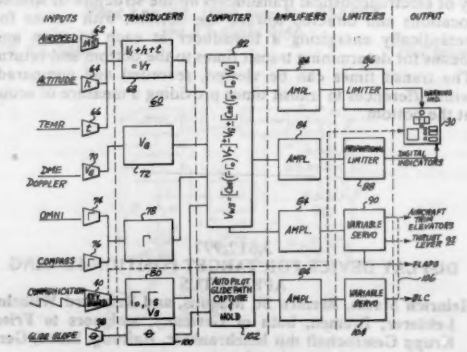


3,618,002

WINDSHEAR WARNING SYSTEM AND INDICATOR

William E. Stinson, Renton, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Mar. 2, 1970, Ser. No. 15,706
Int. Cl. B64d *45/00*
U.S. Cl. 340—27 R **10 Claims**



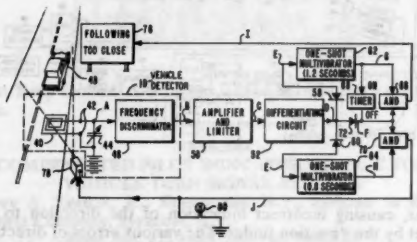
A flight control system and indicator to inform a pilot in advance if a potential windshear condition exists between the aircraft and the airport of intended landing. Current wind velocity and ground speed information from the airport vicinity and the velocity of the aircraft are used as inputs for electrically calculating a signal equal to windshear velocity potential value. This signal is continuously corrected by cur-

rent input variations and displayed by the indicator to the pilot during his approach and descent. If this value persists as descent continues, it constitutes a quantitative warning of an imminent windshear.

3,618,003
VEHICLE INTERVAL DETECTION AND SIGNALING SYSTEM

Arthur N. Marshall, 5501 Kingsbury Road, Richmond, Va.

Filed Mar. 19, 1968, Ser. No. 714,214
Int. Cl. G08g 1/09
U.S. Cl. 340—31 **10 Claims**

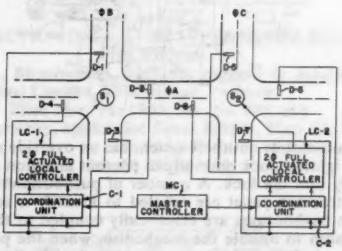


An output from an appropriate detector that senses the presence of a vehicle at a given point in a traffic lane activates a timed conditioning means which maintains one part of a coincident logic arrangement enabled for a predetermined fixed period of time after the vehicle has passed the given point. Another output from the detector indicating the arrival of another vehicle at the given point within the fixed period established by the conditioning means fully enables the coincident logic arrangement which then actuates a warning signal to caution the motorist in the following vehicle that the interval is unsafe or actuates an appropriate recorder, such as a camera, for identifying the vehicle and recording the event.

3,618,004
COORDINATION OF FULL ACTUATED TRAFFIC CONTROLLERS

Ralph M. Riddle, Jr., Moline, Ill., assignor to Gulf & Western Industries, New York, N.Y.

Filed Apr. 8, 1969, Ser. No. 814,407
Int. Cl. G08g 1/08
U.S. Cl. 340—35 **11 Claims**

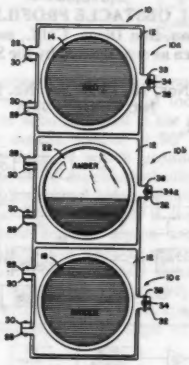


There is disclosed a coordination unit for coordinating the operation of a full actuated traffic controller in an interconnected signalized system. The controller serves to control a traffic signal which displays go, caution, and stop intervals to at least two traffic phases each having associated therewith traffic detector means for detecting traffic in that phase and developing a go interval initiating control signal in response to the detection of traffic and developing a go interval terminating control signal in the other phase or phases. Also, the controller includes control circuit means associated with each phase and comprising, go interval actuation means associated with each phase for commencing a go interval display to the associated phase, and go interval terminating means for terminating the go interval displayed upon removal of a said signal from the control circuit means. The coordination unit comprises means for cyclically timing successive background cycles having each a predetermined time duration; means for dividing the background cycle into at least two background cycle time intervals respectively associated with each of the phases; actuatable means responsive during one of the associated intervals for coupling one of the traffic detector means to an associated one of the control circuit means for the duration of the associated interval so that a control signal developed by the traffic detector means is applied to the control circuit means only during that interval; and, actuatable means responsive during the other associated interval for coupling the other traffic detector means to the associated control circuit means so that a said control signal developed by the other traffic detector means is applied to the other control circuit means only during the other associated interval.

3,618,005
TRAFFIC SIGNAL WITH SHUTTER MEANS

Wayne Emil Jensen, P.O. Box 325, Glenwood, Ill.

Filed Sept. 23, 1968, Ser. No. 761,547
Int. Cl. G08g 1/096
U.S. Cl. 340—43 **20 Claims**



A traffic control signal or a conversion unit therefor having a shutter which is unrolled across the lens of an amber caution light when illuminated so as to progressively decrease its illuminated area in the direction of the red stop light, and thereby indicating the elapse of time until the red stop light is energized. The shutter is connected to a rotatable drum operated by a motor simultaneously energized with the amber light and a spring acts to reroll the unrolled shutter when the motor is deenergized with the lamp of the amber light.

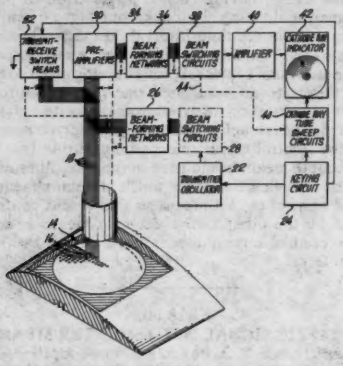
3,618,006
FLUSH-MOUNTED TRANSDUCER ARRAY SONAR SYSTEM

Charles P. Wright, Seattle, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed June 13, 1966, Ser. No. 557,103
Int. Cl. G01s 9/68, 3/00
U.S. Cl. 340—3 R **3 Claims**

1. In a high-speed watercraft having an immersed generally horizontal bottom surface, a sonar system including an array of electroacoustic transducers mounted in substantially horizontal coplanar relationship imposed on an area of said surface, with said transducers emplaced in orderly arrangement of substantially parallel rows which extend transversely to other substantially parallel rows, and with the successive transducers in said rows being at approximately quarter-wavelength spacings, energy transfer means, and beam-forming circuit means operable to connect said individual transducers to said energy transfer means through predetermined

different amounts of electrical delay so as to produce a directional pattern in the operation of said array, and to vary



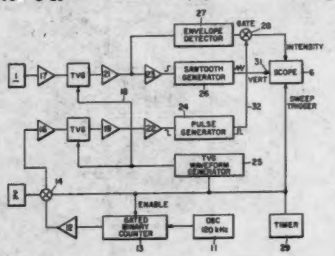
the amounts of delay so as to vary the angular direction of said pattern.

3,618,007

VERTICAL OBSTACLE PROFILING SONAR

Victor C. Anderson, San Diego, Calif., assignor to the United States of America as represented by the Secretary of the Navy

Filed Nov. 18, 1969, Ser. No. 877,715
Int. Cl. G01s *9/68*
U.S. Cl. 340—3 R **10 Claims**



The sonar functions in a pulsed active-mode utilizing a projector to insonify a fan-shaped region of an ocean floor area in front of the submersible. Backscattered signal returns are received by two hydrophones having acoustic centers located in close proximity (about 0.35 inch) one to the other. Range is determined by elapsed time between transmission and reception. Direction in a vertical plane relative to the axis of the submersible is determined by the relative phase between the signal outputs of the vertically spaced hydrophones. The outputs are coupled to a signal processor employing a time-varying gain to compensate for beam-spreading losses and then to separate clipper amplifiers. The positive transition of one clipper output is used to reset a sawtoothed generator and the negative transition of the other clipper triggers a pulse generator. Combining the outputs of the sawtooth and pulse generators provides phase information proportional to the arrival angle of the return signal. When combined with range, the results can be displayed to provide a vertical and horizontal coordinate display for navigation purposes. An envelope detector is connected to one of the signal processor channels to intensity modulate the display for highlighting stronger returns.

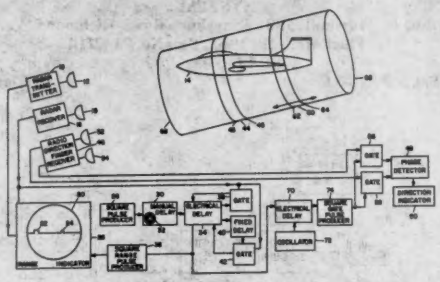
3,618,008

ANTIGLINT RADIO DIRECTION FINDER

Neil C. Kern, Scottsdale, Ariz., assignor to Motorola, Inc., Franklin Park, Ill.

Filed Dec. 15, 1969, Ser. No. 885,182
Int. Cl. G01s *9/02, 9/14*
U.S. Cl. 343—7.3 **5 Claims**

In radio direction finders of the type in which the direction of propogation of a pulse reflected from a target is indicated, errors occur due to glint. The glint is due to the fact that all reflective parts of the target are not at the same distance from the direction finder whereby the several radio echoes reflected from the same target arrive at the direction finder at different times and are vectorially added in the direction



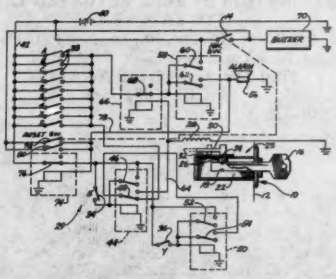
finder, causing incorrect indication of the direction to the target by the direction finder. The various errors of direction, due to glint, measured by direction finders is averaged out by applying a variable range gate to the waves received by the direction finder, whereby angle reflection measurements from various parts of the target are averaged out to give a true indication of direction of the target.

3,618,009

AUTOMOBILE SWITCH CONTROL AND ALARM SYSTEM

Joseph K. Lee, 10616 Bramblebush, Whittier, Calif.

Continuation-in-part of application Ser. No. 711,269, Mar. 7, 1968, now Patent No. 3,541,505. This application Nov. 10, 1969, Ser. No. 875,450
Int. Cl. B60r *25/00*
U.S. Cl. 340—64 **12 Claims**



An automobile antitheft system has an override mechanism for the ignition lock normally to prevent insertion of the ignition key into the lock. A number of pushbuttons located on the instrument panel are labeled to identify a secret code, and the pushbuttons are electrically coupled to the override mechanism to disable the mechanism when the proper code is selected. The pushbuttons are also electrically coupled to an alarm so that selecting an improper code activates the alarm.

3,618,010

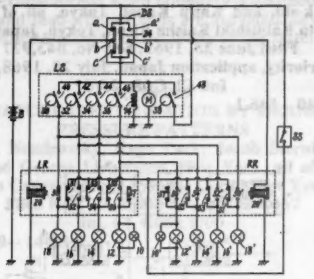
SEQUENTIAL TURN DIRECTION SIGNALLING SYSTEM FOR AUTOMOTIVE

Nagatoshi Suzuki, 356 Kugahara Otaku, Tokyo, Japan

Filed Aug. 2, 1968, Ser. No. 749,814
Int. Cl. B60q *1/38*
U.S. Cl. 340—67 **1 Claim**

According to the invented sequential direction signalling system, a plurality of turn direction signalling lamps are horizontally mounted on each side of the vehicle at one end

thereof and in each plurality, the first lamp to be illuminated on each occasion is always the same, viz., the extremely



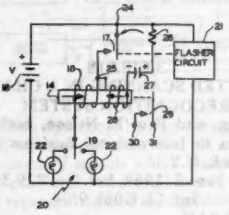
right lamp for left turn or the extremely left lamp for right turn.

3,618,011

COMPENSATED PILOT INDICATOR CIRCUIT FOR VEHICLE TURN SIGNAL SYSTEMS

Harry A. Leeder, Jr., Skaneateles, N.Y., assignor to R. E. Dietz Company, Syracuse, N.Y.

Filed Jan. 27, 1969, Ser. No. 793,933
Int. Cl. B60q *1/38*
U.S. Cl. 340—80 **5 Claims**



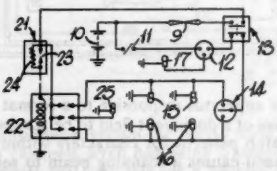
A pilot lamp circuit that indicates to a vehicle operator the direction of the turn he has signaled and also that all of the vehicle turn signal lamps are operable. The circuit includes a pilot relay having a winding in series with the signal lamps and adjusted so that it will not be actuated if one or more of the signal lamps has failed. Normal voltage variations are compensated for by an additional relay winding that is wound so that its current, which is proportional to the source voltage, produces a flux opposed to the main flux.

3,618,012

DIRECTION INDICATOR SYSTEMS FOR ROAD VEHICLES

Eric Shaw, Birmingham, England, assignor to Joseph Lucas (Industries) Limited, Birmingham, England

Filed Mar. 10, 1969, Ser. No. 805,661
Claims priority, application Great Britain, Mar. 11, 1968, 11,691/68
Int. Cl. B60q *1/38*
U.S. Cl. 340—81 F **1 Claim**



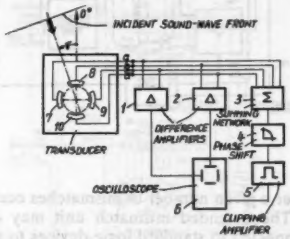
In a direction indicator system for a road vehicle a first flasher unit operates the direction indicator lamp through a direction indicator switch in the usual way, but a control switch is included in the circuit. This control switch has a normal position in which it does not affect the system at all, but an emergency position in which it breaks the circuit to the direction indicator switch and also completes a circuit including a second flasher unit and a relay. The second flasher unit then operates all the flasher lamps simultaneously through the relay to give the emergency signal.

3,618,013

TRANSDUCER FOR DETERMINING THE ANGLE OF INCIDENCE OF SOUND WAVES

Gunter Hans Ziehm, Kiel; Karl-Friedrich Triebold, Bremen, and Siegfried Franz Heinrich Drischel, Duisburg, all of Germany, assignors to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Germany

Continuation-in-part of application Ser. No. 777,806, Nov. 21, 1968, now Patent No. 3,496,527. This application Jan. 30, 1970, Ser. No. 7,054
Int. Cl. H04r *17/00*
U.S. Cl. 340—10 **9 Claims**



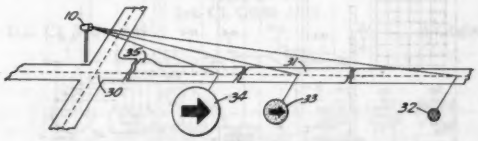
A transducer for converting sound vibrations into electrical signals for determining the angle of incidence of sound waves. The transducer is constructed in the shape of a hollow cylinder. It has four means, spaced at 90° intervals around the hollow cylinder, each of which produces an electrical signal that is dependent on mechanical vibrations of a portion of the hollow cylinder and being connected two by two in opposed series, each pair of which is sensitive to oscillations in only a limited angular region around the hollow cylinder, and throughout this angular region, the sensitivity of each pair is varied. The difference signals, formed from the signals produced by each two oppositely arranged means connected two by two, are thus made independent of the harmonics which are a function of the angle of incidence of the waves.

3,618,014

VARIABLE INDICATION CONTROL SIGNAL

Gunnar R. Ljungkull, White Bear Lake, Minn., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Aug. 27, 1969, Ser. No. 853,443
Int. Cl. B60g *1/00*
U.S. Cl. 340—112 **11 Claims**



A traffic signal, appearing from a distance as a simple warning light, converts progressively into an instructional signal as viewed during the approach.

3,618,015

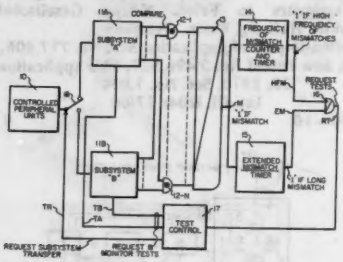
APPARATUS FOR DISCRIMINATING BETWEEN ERRORS AND FAULTS

Henry Peter Homonick, Ottawa, Ontario, Canada, assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed June 30, 1970, Ser. No. 51,256
Int. Cl. G08c *25/00*; **H04m** *3/08*
U.S. Cl. 340—146.1 **20 Claims**

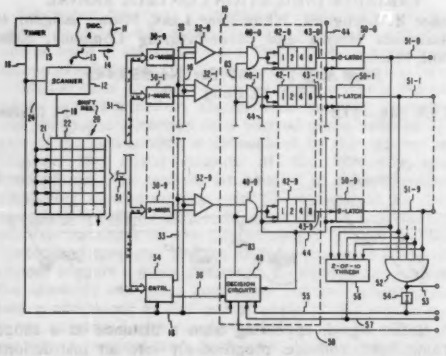
Signal points of duplicated subsystems are compared, to produce a mismatch if they differ. Since mismatches due to

errors caused by noise, etc. occur infrequently and at random, and are of short duration, relative to mismatches caused by actual faults; apparatus to discriminate between them comprises a high frequency of occurrence of mismatches unit, and an extended mismatch unit. The high frequency of occurrence unit includes a counter and timer to



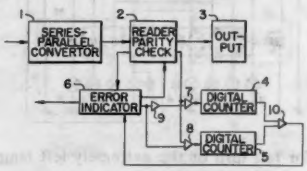
detect whether a given number of mismatches occur within a given time. The extended mismatch unit may comprise a capacitor connected to standard logic devices to charge during a mismatch via resistance within the logic devices, and to be short-circuited via a transistor in a logic device at other times.

3,618,016
CHARACTER RECOGNITION USING MASK INTEGRATING RECOGNITION LOGIC
Hein Van Steenis, Amstelveen, Netherlands, assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Nov. 20, 1969, Ser. No. 878,502
Claims priority, application Netherlands, Nov. 29, 1968, 6817194
Int. Cl. G06k *9/06*
U.S. Cl. 340—146.3 Y **20 Claims**



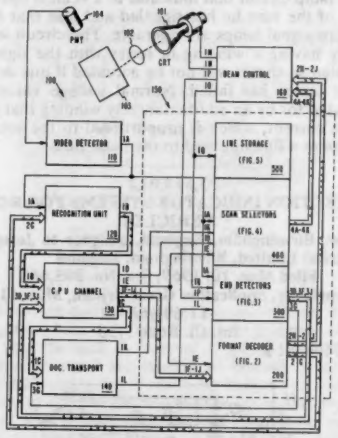
A graphic character is scanned and entered in a shift register. Combinatorial-logic masks detect respective video features from the shift register. Pulses from each mask advance separate counters. In a later decision cycle, a number of artificial pulses advance all counters simultaneously. When the first counter overflows, a number of further artificial pulses advance all counters. If one and only one counter overflows, the character is recognized; otherwise, the character is rejected. Either set of artificial pulses may be made variable.

3,618,017
DATA PROCESSING SYSTEM
Noboru Murayama, Saganihara-shi; Kinichi Yoshikawa, Kawasak-shi, and Kanji Kanai, Tokyo, all of Japan, assignors to Kabushiki Kaisha Ricoh, Tokyo, Japan
Filed June 23, 1969, Ser. No. 843,977
Claims priority, application Japan, July 25, 1968, 43/52114
Int. Cl. G08c *25/02*
U.S. Cl. 340—146.1 **2 Claims**



A data processing system wherein a receiver counts and stores the number of digits of one block of data received from the first digit thereof until an erroneous digit is detected; when said erroneous digit is detected, the output is prevented from being applied to an output medium while the retransmission of said one block of data from the first digit thereof is made; and when the number of digits retransmitted coincides with said first-mentioned number of digits, the outputs of the subsequent digits are applied to said output medium.

3,618,018
UNFORMATTED SCANNING IN A CHARACTER-RECOGNITION SYSTEM
David L. Johnston, and Paul E. Nelson, both of Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed June 2, 1969, Ser. No. 829,397
Int. Cl. G06k *9/04*
U.S. Cl. 340—146.3AH **18 Claims**



Scan-control apparatus responsive to a format word specifying boundaries of a document field to be scanned generates a series of search patterns for characters within the field. A "read" command causes a scanning beam to seek the intersection of horizontal and vertical boundaries contained in the format word. A line-search scan travels downward therefrom until black video is detected. A character-search scan then moves horizontally to establish the beginning of a character line. The first character is normalized, a recognition scan is initiated, and the vertical position of the line is digitally recorded. Reaching the format end-of-line boundary, or detection of a number of blank spaces, terminates the "read"

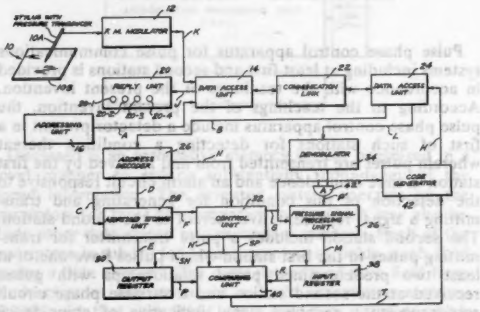
command. Further "load-format" and "read" commands cause the beam to seek the format word horizontal boundary and the recorded vertical position. The field is terminated when the vertical format word boundary is attained. Tests for document and read-window ends are provided. Several types of format words enhance the flexibility of the system.

3,618,019

SIGNATURE IDENTIFICATION BY MEANS OF PRESSURE PATTERNS

Samuel M. Nemirovsky, Rego Park; Jacob Sternberg, New York, and George Lieberman, New York, all of N.Y., assignors to Conversational Systems Corp., New York, N.Y.

Filed Nov. 13, 1969, Ser. No. 876,467
Int. Cl. G06k 9/00
U.S. Cl. 340—146.3 R 8 Claims



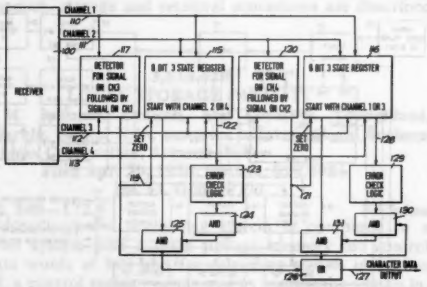
A system verifies signatures by converting the pressure patterns generated when a person writes his signature to binary coded combinations of signals which are then compared for similarity with previously recorded binary coded combinations of signals representing known signatures.

3,618,020

DATA TRANSMISSION SYSTEMS

Bernhard Dollman Parker, London, England, assignor to Decca Limited, London, England

Filed Apr. 9, 1970, Ser. No. 26,976
Claims priority, application Great Britain, Apr. 9, 1969, 18183/69
Int. Cl. H04q 9/00
U.S. Cl. 340—147 R 17 Claims



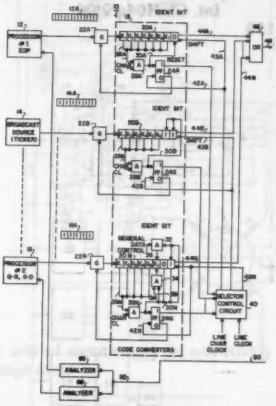
A data transmission system for binary form data has four transmission channels, even bits being transmitted on a first pair of channels and odd bits on a second pair. Between blocks (typically corresponding to alphanumeric characters) interblock indicators are transmitted alternately of different distinctive form, each interblock indicator being a transmission on typically, two channels selected as a combination which cannot occur during the blocks. The receiver has interblock indicator detectors to indicate an error, if after each character, a correct interblock indicator is not received.

3,618,021

DATA COMMUNICATION SYSTEM AND TECHNIQUE OF TAGING DATA OF DIFFERENT CLASSES

Emik A. Avakian, 92 Juana St., Crestwood, Tuckahoe, N.Y., and Murray Sumner, 704 Palmer Court, Mamaroneck, N.Y.

Filed Mar. 24, 1969, Ser. No. 809,530
Int. Cl. H04q 9/00
U.S. Cl. 340—147 16 Claims



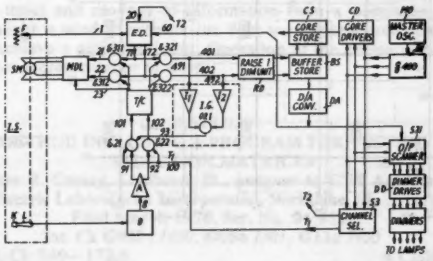
A data communication technique particularly adapted for transmitting over a single channel or line information of two or more classes, such as information developed by multiple sources, on a time-shared basis. Code characters containing corresponding information units are converted to transmission characters having at least one additional data bit the state of which is controlled so as to identify the class from which the original code character was derived. Analyzer equipment at a receiving station senses the class-identifying bit and serves to reassociate all of the information units of the respective classes. The transmission system can be used in man-machine applications, monitoring applications, closed-loop control applications and over computer communications, etc.

3,618,022

CONTROL APPARATUS

Anthony Leonard Isaacs, and John Victor James Corney, both of London, England, assignors to British Lighting Industries Limited, London, England

Filed Sept. 5, 1969, Ser. No. 855,688
Claims priority, application Great Britain, Sept. 6, 1968, 42,639/68
Int. Cl. G05b 1/00
U.S. Cl. 340—149 6 Claims



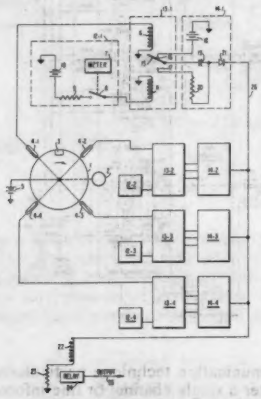
Control apparatus for use at an operator-plant interface, for example for controlling stage-lighting equipment, having three signal stores of which the first and second give control signal outputs and the third serves either to set the signals in

the first and second stores or to indicate the signal in the first or second stores. The third store may include a setting lever which serves for adjustment of the control signals and also indicates by its position the magnitude of those signals.

3,618,023
SYSTEM FOR COMBINING A PLURALITY OF PULSES INTO A SINGLE PULSE TRAIN

Theodore Parker, Findlay, Ohio, assignor to Marathon Oil Company, Findlay, Ohio

Filed May 17, 1968, Ser. No. 729,969
Int. Cl. H04q *9/00*
U.S. Cl. 340—150 **3 Claims**

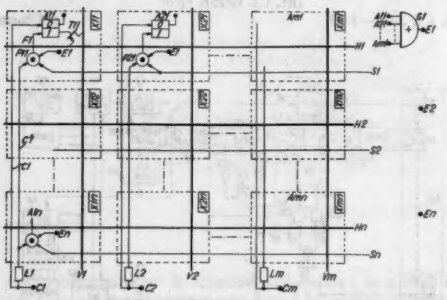


A system for receiving pulses from a plurality of devices which measure a quantity such as fluid flow and for storing separately the pulses from each such device in individual storage elements. The individual storage elements are sequentially interrogated to provide output pulses onto a common output line from the elements which are storing pulses.

3,618,024
ELECTRONIC MULTISELECTOR

Marc Jean Pierre Leger, Issy-Les-Moulineax; Claude Paul Henri Le Rouge, Maurepas Trappes, and Jacques Henri De Jean, Ris-Orangis, all of France, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Dec. 5, 1968, Ser. No. 788,114
Claims priority, application France, Dec. 12, 1967, 131,905
Int. Cl. H04q *3/00*
U.S. Cl. 340—166 R **3 Claims**

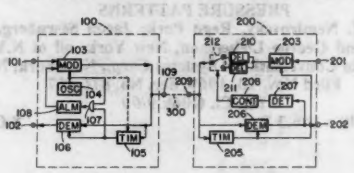


A switching matrix includes horizontal and vertical multipies having MOS field effect transistor cross-points. A bistable circuit at the cross-point remembers the busy or idle state of the cross-point. The cross-point is particularly well adapted for integrated or monolithic devices.

3,618,025
PULSE PHASE CONTROL APPARATUS FOR PULSE COMMUNICATIONS SYSTEMS

Atsushi Tomozawa, Tokyo, Japan, assignor to Nippon Electric Company, Limited, Tokyo, Japan

Filed Sept. 18, 1969, Ser. No. 859,056
Claims priority, application Japan, Sept. 20, 1968, 43/68498
Int. Cl. H04q *9/00*; H04l *5/14*
U.S. Cl. 340—170 **18 Claims**

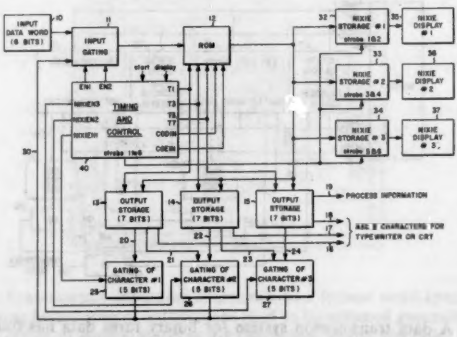


Pulse phase control apparatus for pulse communications systems including at least first and second stations is provided in accordance with the teachings of the present invention. According to the teachings of the present invention, the pulse phase control apparatus include a detector present in a first of such stations for detecting a condition thereat wherein pulses are transmitted from and received by the first station in time coincidence and an alarm circuit responsive to the detection of this condition for generating and transmitting a signal representative thereof to the second station. The second station includes a pulse transmitter for transmitting pulses to the first station which pulses have one of at least two predetermined phase relationships with pulses received at the second station and a variable phase circuit responsive to a received signal indicative of coincidence phase condition at the first station for changing the phase of the pulses transmitted from the second station from one predetermined phase relationship with respect to the pulses received at the second station to another. The pulse phase control apparatus according to the present invention thereby enables the simultaneous, bidirectional transmission of pulses between such at least first and second stations even though a common transmission path therebetween is relied upon.

3,618,026
CHARACTER GENERATOR

Frank H. W. Schoenwitz, Schaumburg, Ill., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Mar. 16, 1970, Ser. No. 19,980
Int. Cl. H01j *17/48*; G06f *5/02*
U.S. Cl. 340—172.5 **6 Claims**



A character generator comprising a read-only-memory which accepts an input data word of six bits and from its output generates code for a set of three ASCII letters for printout on a typewriter. The three ASCII letters code in turn are converted to the same three letters of NIXIE code, these ASCII output words being rerouted into the read-only-memory and the second output being in NIXIE code for providing visual readout on segmented indicators.

3,618,027

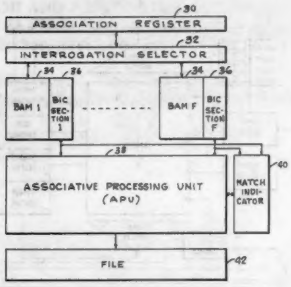
ASSOCIATIVE MEMORY SYSTEM WITH REDUCED REDUNDANCY OF STORED INFORMATION

Tse-yun Feng, Dewitt, N.Y., assignor to Research Corporation, New York, N.Y.

Filed Mar. 27, 1970, Ser. No. 23,306

Int. Cl. G06f *15/00*

U.S. Cl. 340—172.5 **18 Claims**



Disclosed is an associative memory system organized in a novel manner to reduce substantially redundancy of the stored information. The invented system operates on the descriptors (or tags) of information items which may also include other data stored in a secondary memory. Each of the descriptors is subdivided into a number of fields, each field storing a data element. The data elements of each field from all descriptors are stored in a basic associative memory (BAM) such that each BAM stores only data elements which are distinct from each other. Redundancy of data elements in a BAM is thus eliminated. The relationships between the data elements of the several fields of a descriptor are stored in a relation cube which may be in the form of an associative processing unit storing, like a conventional associative memory, words which correspond in number to the descriptors stored in the BAMs and consist of the same number of fields, but contain in the fields shorter codes representing the corresponding data elements. Alternatively, the function of the relation cube is carried out by a multidimension matrix of special storage elements in order to afford further reduction of storage redundancy. Each of the basic associative memories and, in some cases the matrix, may be decomposed into several distinct levels. The decomposition results in further elimination of redundancy.

The invented associative memory system allows a variety of point and line searches, and allows for resolution of multiple responses by different types of ordered retrievals. Exemplary search, storage and retrieval procedures are described in detail.

3,618,028

LOCAL STORAGE FACILITY

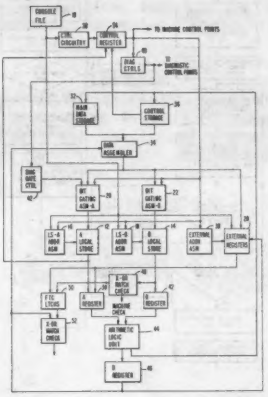
Allen M. Johnson, Endicott, and Loyal D. Youngblood, Apalachin, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 20, 1970, Ser. No. 029,898

Int. Cl. G06f *11/00*

U.S. Cl. 340—172.5 **9 Claims**

A microdiagnostic processing system is combined in a computer system with a main storage memory for control and data words of bits and for providing signals indicative thereof, a control register connected to receive the signals indicative of control words and to execute the same, a processing unit for performing logical operations on signals indicative of such words and two local storage units for receiving, storing, and transmitting signals indicative of such words and connected to receive such signals from the main storage memory and from the processing unit and to transmit such signals to the main storage memory and the processing unit. The microdiagnostic system includes a local file providing a stored program of signals indicative of control and data words and connected to supply the signals to the control register and the local storage units and inhibit means under the control of the control register for disabling one only of the two local storage units from receiving signals for storage, so that different sets of signals may be selectively stored in the two local storage units.



3,618,029

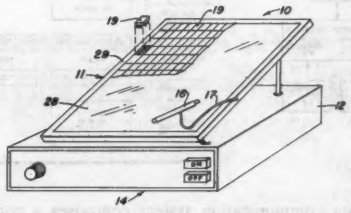
DRAWING BOARD, A GRAPHICAL INPUT-OUTPUT DEVICE FOR A COMPUTER

Robert M. Graven, 1709 Shattuck Ave., Berkeley, Calif.

Continuation-in-part of application Ser. No. 644,756, May 25, 1967, now abandoned. This application May 1, 1970, Ser. No. 33,855

Int. Cl. G06f *3/00*; **G06k** *15/18*

U.S. Cl. 340—172.5 **7 Claims**



A two-dimensional matrix of semiconductors is arranged in ordered array as a flat, light-emitting and light-sensing device for input and readout of information from a computer. A penlight is used to activate the light-sensing semiconductors to achieve a graphical input. Operation of the device can be either incremental or random.

3,618,030

METHOD INCLUDING A PROGRAM FOR TESTING SELECTION MATRICES

James R. Creasy, Lombard, Ill., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

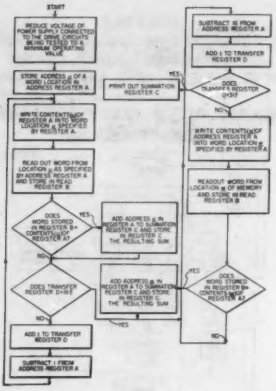
Filed May 4, 1970, Ser. No. 34,912

Int. Cl. G06f *11/00*; **G05b** *1/01*; **G11c** *7/00*

U.S. Cl. 340—172.5 **4 Claims**

The usual equipments of computers can be used to respond to a program to provide data that indicates location of a fault in a selection matrix of an alterable memory being tested. The data required is obtained from the summation of the addresses that are also the locations of selected words of

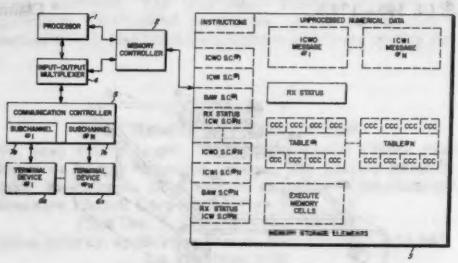
the memory. Each different sum either indicates the exact fault, or designates that only a small number of certain component parts associated with a designated word location needs to be tested.



3,618,031
DATA COMMUNICATION SYSTEM

James A. Kennedy; Aldis Klavins, and Robert J. Koegel, all of Phoenix, Ariz., assignors to Honeywell Information Systems Inc.

Filed June 29, 1970, Ser. No. 50,792
Int. Cl. G06f 9/18
U.S. Cl. 340—172.5 20 Claims



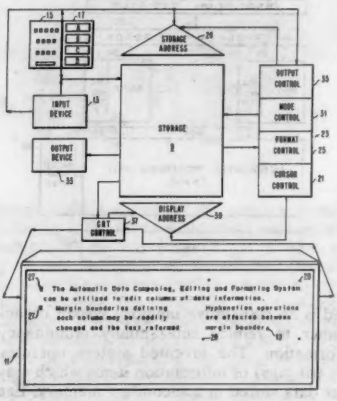
A data communication system comprises a communications controller and a processor having fixed hardware which utilizes control characters stored in memory to detect the end of messages being received from a variety of terminal devices, to detect changes in message code sets and to perform a variety of other functions. This system can accommodate a wide variety of message code sets, message formats, bit rates and line disciplines without any modification of hardware in the controller and processor.

3,618,032
AUTOMATIC DATA COMPOSING, EDITING AND FORMATTING SYSTEM

Paul E. Goldsberry, and Jack Ward Simpson, both of Lexington, Ky., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 9, 1968, Ser. No. 782,285
Int. Cl. G06f 15/02, 15/40, 3/14
U.S. Cl. 340—172.5 30 Claims

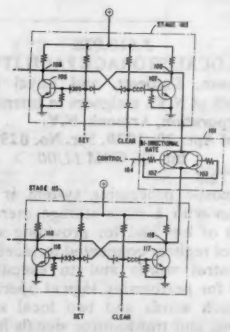
A data composing, editing and formatting system for use in business offices by typists and composers of business letters and documents. A cathode-ray tube display is utilized to display keyed data and data inputted by a secondary media reader in a manner analogous to the display of a page of typed data on a typewriter. Once the data is so inputted, additional data can be inserted at a point defined by the operator without any resulting loss of information, word integrity, columnar definition or paragraph designation. Additionally, data can be deleted and the data located down page from the deleted data will shift up page to fill in where the deleted data was located without loss of paragraph designation. Text modification controls further include data centering within defined margins, transfer of data from one page position to another without loss of data or paragraph definition, automatic adjustment of the data to conform to new margin settings and a unique hyphenation operation. Once the data has been inputted and modified, it is transferred to a serial printer and/or a secondary media recorder for permanent recording. Special controls effect the optimum utilization of the serial printer by utilizing margin stop locations of the displayed data as well as tab stop location to define printer tabulation operations.



3,618,033
TRANSISTOR SHIFT REGISTER USING BIDIRECTIONAL GATES CONNECTED BETWEEN REGISTER STAGES

Walter R. Nordquist, Naperville, and Wing N. Toy, Glen Ellyn, both of Ill., assignors to Bell Telephone Laboratories Incorporated, Murray Hill, Berkeley Heights, N.J.

Filed Dec. 26, 1968, Ser. No. 787,185
Int. Cl. H03k 21/00, 23/00
U.S. Cl. 340—172.5 6 Claims



Shift register circuitry is disclosed in which bidirectional gates are connected between register stages in such a manner that data may be shifted in either direction through a gate to alter the state of either interconnected stage. By use of the bidirectional gates the shift register circuitry can store the logical AND or OR of the contents of the interconnected

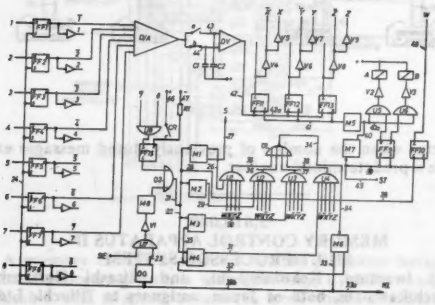
stages without employing additional complex control or steering circuitry intermediate the register stages. The shift register circuitry can also be used in various data processing shift and rotate functions in which a second register acts as intermediary for the shifting or rotation of data through a first register.

3,618,034

METHOD AND SYSTEM FOR CONTROLLING PRINTOUT ELEMENTS IN A PRINTOUT MECHANISM

Klaus Jorg Hecker, 6242 Schonberg/Uber, Kronberg, Germany

Filed Apr. 7, 1969, Ser. No. 813,996
Claims priority, application Germany, Apr. 5, 1968, P 17 74 093.1
Int. Cl. G04c *23/00*; **G05b** *19/32*
U.S. Cl. 340—172.5 **8 Claims**



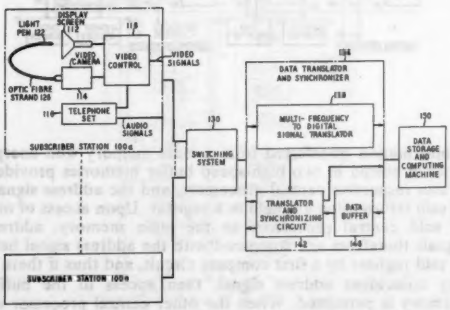
The printout of a first and second printout element to be activated consecutively is controlled by storing a corresponding first and second location dependent selection signal and obtaining the difference therebetween. The second printout element is then activated after a time period following activation of the first printout element which depends upon this difference in selection signals.

3,618,035

VIDEO-TELEPHONE COMPUTER GRAPHICS SYSTEM

Robert L. Simms, Jr., Colts Neck, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.

Filed Apr. 17, 1969, Ser. No. 817,035
Int. Cl. G06f *3/14, 3/16*
U.S. Cl. 340—172.5 **11 Claims**



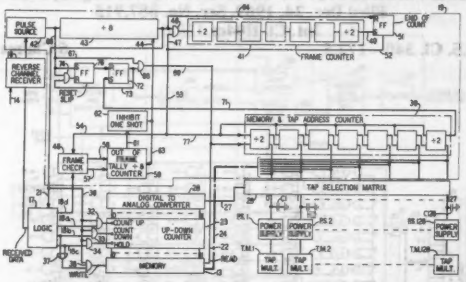
A system and method of employing a video-telephone station in conjunction with a remote time-shared computer for graphic display purposes including a fiber optic strand connecting a light pen to the video-telephone camera. The video-telephone camera is connected to the computer via a data translator and synchronizing circuit. The data translator translates video signals received from the station into digital signals for application to the computer, and also translates digital signals received from the computer into video signals for transmission to the station. The synchronizing circuit monitors the scanning phase of video signals received from the station and synchronizes therewith the video signals which are transmitted to the station.

3,618,036

INTERLACED COUNTING CIRCUITS

Robert L. Carbrey, Colts Neck, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 18, 1968, Ser. No. 784,646
Int. Cl. G06f *9/00*
U.S. Cl. 340—172.5 **16 Claims**



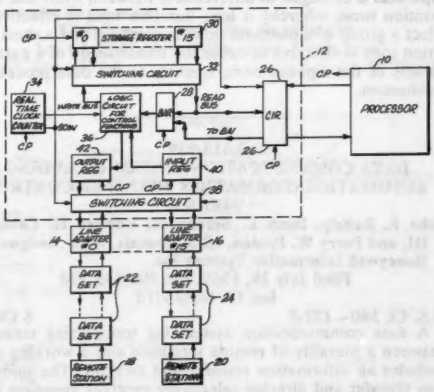
A circuit is described for coordinating the addressing of a plurality of tap multipliers in a transversal filter, which is employed as a pre-equalizer. with a received data stream. The data stream updates information stored in a memory. The updated information is applied to the tap multipliers at a rate eight times the rate that the data stream updates the memory. A memory and tap address counter, operating at a rate that the information is applied to the taps is synchronized with the updating data stream by causing the address counter to slip one count for each cycle thereof.

3,618,037

DIGITAL DATA COMMUNICATION MULTIPLE LINE CONTROL

James E. Wollum, Glendora, and Millard J. Arvig, San Gabriel, both of Calif., assignors to Burroughs Corporation, Detroit, Mich.

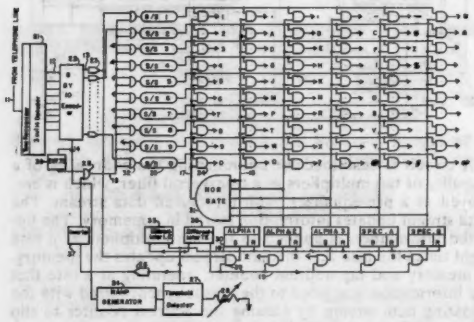
Filed Sept. 19, 1969, Ser. No. 859,536
Int. Cl. G06f *3/04*
U.S. Cl. 340—172.5 **12 Claims**



There is described a control unit for buffering a plurality of digital data communication lines with a data processor on a time-shared basis, where each communication line may be

operating with a different line discipline. All buffering functions for each communication line are under control of a stored word. The stored control words, together with each of the associated communication line adapter terminals, are continuously scanned and logic circuitry, in response to each control word when scanned, determines the status of the communication and modifies the control word if the status has changed. Timing functions for all communication lines are derived, also on a time-shared basis, from a single real-time clock. The processor can monitor each control word during each scan to change the status of the communication operation with the associated line and to sense interrupt conditions requiring attention.

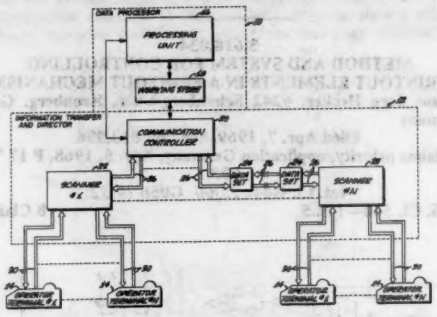
3,618,038
TELEPHONIC DATA TRANSMITTING SYSTEM
Edward S. Stein, 5717 Nevada Ave. N.W., Washington, D.C.
Filed Dec. 24, 1969, Ser. No. 887,915
Int. Cl. H04m *11/06*
U.S. Cl. 340—172.5 **6 Claims**



A data processing system comprising a telephone touch tone signaling set having a plurality of buttons thereon, an apparatus connected to the telephone system at the receiving end capable of being controlled by said touch tone signaling set according to the length of time that the buttons are pressed, to transmit alphanumeric data and programming data and a data processing mechanism for receiving said programming data and other data for processing the same. The apparatus is arranged to differentiate between short and long duration tones whereby a long duration tone is effective to select a group of alphanumeric data symbols, and a short duration tone is effective to cause the transmission of a particular one of the alphanumeric symbols to the data processing mechanism.

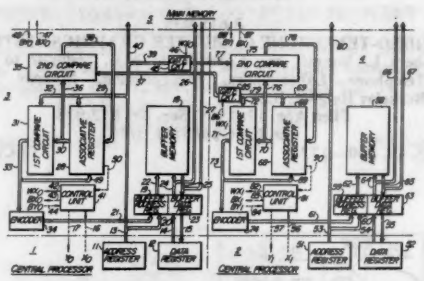
3,618,039
DATA COMMUNICATION SYSTEM INCLUDING AUTOMATIC INFORMATION TRANSFER CONTROL MEANS
John F. Baltzly; Donn E. Bernhardt; Edward H. Cabaniss, III, and Perry W. Penton, all of Phoenix, Ariz., assignors to Honeywell Information Systems Inc.
Filed July 28, 1969, Ser. No. 845,398
Int. Cl. G06f *9/18*
U.S. Cl. 340—172.5 **6 Claims**

A data communication system for transferring messages between a plurality of remote terminals and a working store includes an information transfer and director. The information transfer and director selectively receives messages from the terminals, adds a message identifier to each message representing currency (software processing of message required), stores the messages in the working store, selectively tests for the presence of the message identifier in the messages previously stored, and inhibits the transmittal of messages from the terminals to the information transfer and



director when the number of previously stored messages exceeds a predetermined number.

3,618,040
MEMORY CONTROL APPARATUS IN MULTIPROCESSOR SYSTEM
Shoji Iwamoto, Kokubunji-shi, and Hisashi Horikoshi, Tachikawa-shi, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed Sept. 17, 1969, Ser. No. 858,639
Claims priority, application Japan, Sept. 18, 1968, 43/66915
Int. Cl. G06f *15/16*
U.S. Cl. 340—172.5 **10 Claims**



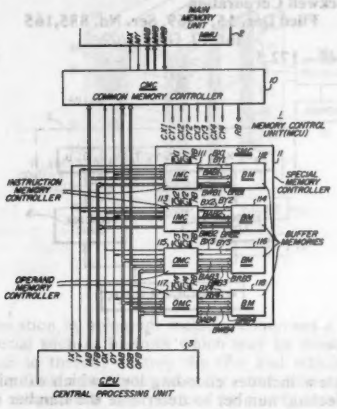
Information transferred from a main memory with energy block is stored in two high-speed buffer memories provided in two respective central processors, and the address signals of said information are held in a register. Upon access of one of said central processors to the main memory, address signals therefrom are compared with the address signal held in said register by a first compare circuit, and thus if there is any coincident address signal, then access to the buffer memory is permitted. When the other central processor effects "write-in" with respect to the main memory, an address signal forwarded by said other central processor is compared with the address signals held in said register by a second compare circuit, and thus if there is any coincident address signal, then the corresponding information is made invalid so as to avoid disagreement between the contents of the main memory and buffer memories.

3,618,041

MEMORY CONTROL SYSTEM

Hisashi Horikoshi, Tachikawa-shi, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 29, 1969, Ser. No. 872,002
Claims priority, application Japan, Oct. 31, 1968, 43/79557
Int. Cl. G06f *13/00*
U.S. Cl. 340—172.5 11 Claims



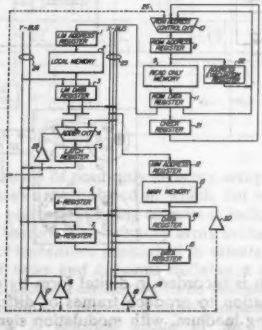
A memory control system for a data processor having a central processing unit, a main memory, a buffer memory operable with a speed several to more than 10 times the speed of the main memory, and a memory control unit for checking whether information at an address is transferred from the main memory and stored in the buffer memory. The memory control unit includes an instruction memory control section and an operand memory control section which can operate independently of each other so as to improve the processing ability of the data processor.

3,618,042

ERROR DETECTION AND INSTRUCTION REEXECUTION DEVICE IN A DATA PROCESSING APPARATUS

Ryoji Miki; Hiroshi Morita, and Toshihiko Odaka, all of Hatano-shi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 29, 1969, Ser. No. 872,285
Claims priority, application Japan, Nov. 1, 1968, 43/79324
Int. Cl. G06f *11/00, 11/10*
U.S. Cl. 340—172.5 8 Claims



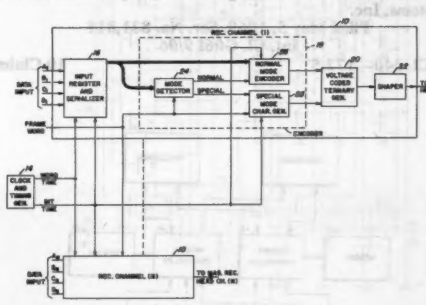
In a data-processing apparatus, the data-processing speed is remarkably reduced if the system is stopped from operation every time error operation occurs. This specification discloses a data-processing apparatus wherein when execution of an instruction is effected by means of several stages sequentially controlled, a register adapted for indicating whether the reexecution should be effected for each instruction when error operation occurs, whether the reexecution should be effected for each stage and whether the reexecution is impossible is successively set so that when error operation occurs, the reexecution sequence is started in accordance with the command of said register.

3,618,043

INFORMATION-HANDLING SYSTEM ESPECIALLY FOR MAGNETIC RECORDING AND REPRODUCING OF DIGITAL DATA

John S. Whiting, Canandaigua, N.Y., assignor to General Dynamics Corporation

Filed Nov. 14, 1969, Ser. No. 876,981
Int. Cl. G06f *5/02*; G05b *13/02*; G11b *5/86*
U.S. Cl. 340—172.5 10 Claims



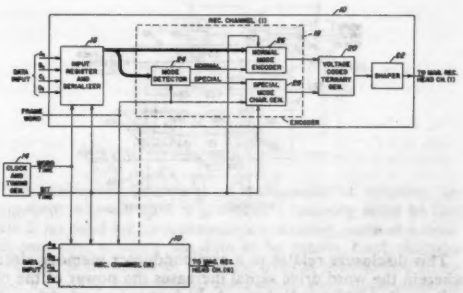
A system for storage on a magnetic record medium (tape or disc) of data with an extremely high packing density is described. Binary input information is encoded into a ternary signal for recording. That ternary signal has spectral properties which facilitate recording with extremely high bit-packing density. The ternary signal also contains timing information. On playback the signal is decoded into binary coded ternary form. Timing information with respect to words of ternary data, as well as the individual terts which make up the words, is also derived. The system includes means for synchronizing the reproduced data in accordance with the timing information derived from the data itself, as well as with an external clock, and decodes the data into the original binary form.

3,618,044

INFORMATION-HANDLING SYSTEM ESPECIALLY FOR MAGNETIC RECORDING AND REPRODUCING OF DIGITAL DATA

Frederick B. Cupp, Monroe, N.Y., assignor to General Dynamics Corporation

Filed Nov. 14, 1969, Ser. No. 876,972
Int. Cl. G06f *5/02*; G05b *13/02*; G11b *5/86*
U.S. Cl. 340—172.5 27 Claims



A system for storage on a magnetic record medium (tape or disc) of data with an extremely high packing density is

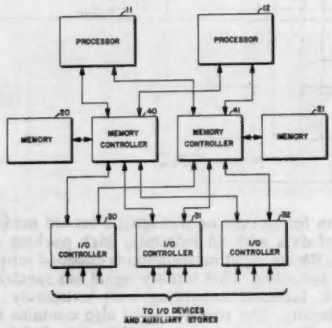
described. Binary input information is encoded into a ternary signal for recording. That ternary signal has spectral properties which facilitate recording with extremely high bit packing density. The ternary signal also contains timing information. On playback the signal is decoded into binary-coded ternary form. Timing information with respect to words of ternary data, as well as the individual terts which make up the words, is also derived. The system includes means for synchronizing the reproduced data in accordance with the timing information derived from the data itself, as well as with an external clock, and decodes the data into the original binary form.

3,618,045

MANAGEMENT CONTROL SUBSYSTEM FOR MULTIPROGRAMMED DATA PROCESSING SYSTEM

Donald J. Campbell, Lansdale, and William J. Heffner, Robesonia, both of Pa., assignors to Honeywell Information Systems, Inc.

Filed May 5, 1969, Ser. No. 821,811
Int. Cl. G06f *9/06*
U.S. Cl. 340—172.5 **10 Claims**



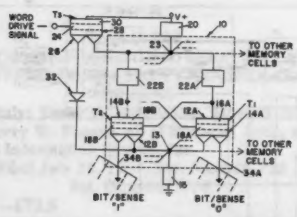
A multiprogrammed data processing system, wherein working storage space in which user programs are executed is also employed for executing certain portions of the operating system in providing the management control functions required to implement the multiprogrammed function of the data processing system.

3,618,046

BILEVEL SEMICONDUCTOR MEMORY CIRCUIT WITH HIGH-SPEED WORD DRIVER

Richard W. Bryant, Poughkeepsie, and George K. Tu, Wappingers Falls, both of N.Y., assignors to Cogar Corporation, Wappingers Falls, N.Y.

Filed Mar. 9, 1970, Ser. No. 17,567
Int. Cl. G11c *11/40*
U.S. Cl. 340—173 FF **10 Claims**



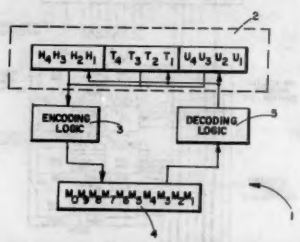
This disclosure relates to a semiconductor memory circuit wherein the word drive signal increases the power of the circuit a. it enables selection. A high-speed word driver increases the speed of the storage element's response to the word drive signal. The increased power is achieved by effectively reducing an impedance in the collector power supply circuit upon the appearance of the word drive signal. The increased response speed is achieved by means of a parallel connection of the word drive signal directly to the storage elements of the memory circuit.

3,618,047

SYSTEM FOR THE COMPACT STORAGE OF DECIMAL NUMBERS

Theodore M. Hertz, Whittier, Calif., assignor to North American Rockwell Corporation

Filed Dec. 15, 1969, Ser. No. 885,165
Int. Cl. G06f *5/02*
U.S. Cl. 340—172.5 **9 Claims**



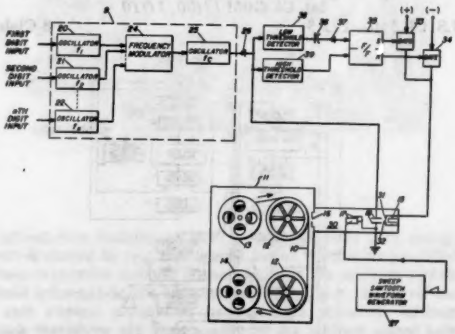
The system includes encoding logic which examines each bit of a decimal number to determine the number and position of high-valued digits, eight or nine, in the decimal number. Certain storage bit positions are allocated to the high-valued digits. The high-valued digits are not encoded in the normal sense. The logic state of the certain storage bit positions indicate value and position of the high-valued digits in the decimal number. The remaining digits of the decimal number are encoded and stored in the remaining bit positions. Decoding logic examines the stored bits of information to provide as an output the decoded decimal number.

3,618,048

RANDOM ACCESS LARGE-CAPACITY MEMORIES

Keith S. Pennington, Putnam Valley, N.Y., and William E. Glenn, Jr., Stamford, Conn., assignors to General Electric Company

Filed July 25, 1968, Ser. No. 747,586
Int. Cl. G11c *11/46*
U.S. Cl. 340—173 **21 Claims**

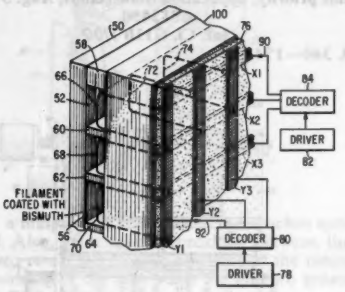


Information is recorded in digital form by employment of scanned radiation to produce frames of diffraction gratings on a recording medium, with modulation signals controlling spacing between grating lines. Recorded frames are then arranged in a matrix, and the resulting memory is interrogated by illuminating the desired frame with a beam of coherent light. Random access retrieval of data is accomplished by impinging light from the interrogated frames onto photodetecting means.

3,618,049
HOLOGRAM MEMORY

Juan J. Amodei, Levittown, Pa., and Reubens Mezrich, Hightstown, N.J., assignors to RCA Corporation

Filed Mar. 21, 1969, Ser. No. 809,137
Int. Cl. G11c *11/00*
U.S. Cl. 340—173 9 Claims

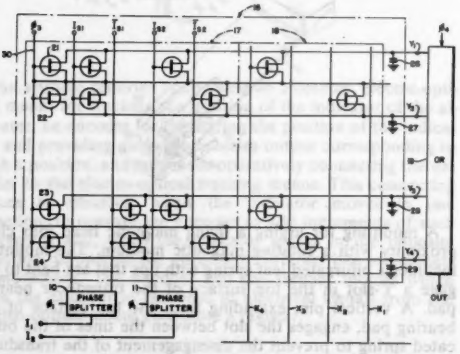


Each location in hologram memory comprises a thin film of a material such as bismuth which may be erased with a laser beam to thereby destroy the film and which may be restored by flash evaporating onto the same area a new film. The flash evaporation is performed by a very small heating element impregnated with metal at each location.

3,618,050
READ-ONLY MEMORY ARRAYS IN WHICH A PORTION OF THE MEMORY-ADDRESSING CIRCUITRY IS INTEGRAL TO THE ARRAY

Richard H. Heeren, Chicago, and Charles R. Winston, Deerfield, both of Ill., assignors to Teletype Corporation, Skokie, Ill.

Filed May 7, 1969, Ser. No. 822,521
Int. Cl. G11c *17/00, 11/40, 7/00*
U.S. Cl. 340—173 SP 17 Claims

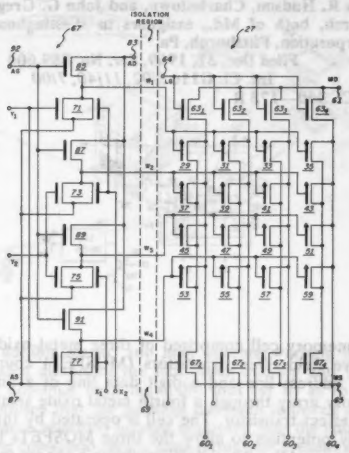


Two embodiments of read-only memory arrays arranged in columns and rows are disclosed in which, for each embodiment, one of a pair of accessing circuits is included as additional columns therein. The memory array includes a plurality of field-effect transistors positioned in selected patterns at intersections of rows and columns defining a matrix. Each transistor in a column is connected to be actuated in parallel by a column conductor, providing an ON impedance in their respective rows. A selected group of the columns are memory columns, in which the location of the transistors is selected in accordance with a desired information pattern to be read out. Further columns are access columns in which the transistors are located in selected different patterns to provide an ON impedance in all but a selected one of the rows in response to different switching signal patterns.

3,618,051
NONVOLATILE READ-WRITE MEMORY WITH ADDRESSING

Robert E. Oleksiuk, Carlisle, Mass., assignor to Sperry Rand Corporation, Great Neck, N.Y.

Filed May 9, 1969, Ser. No. 823,253
Int. Cl. G11c *11/40*; H03k *3/29*
U.S. Cl. 340—173 R 7 Claims

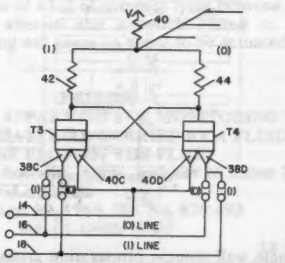


Variable-threshold insulated gate field effect transistors are used as memory elements in an integrated circuit memory array. A word-select address decoder is junction isolated from the rest of the memory. Substrates of all memory transistors are kept at the same voltage level and gating means are used to switch suitable voltages to remaining drain and source electrodes of individual memory cells for READ-WRITE functions. Logic level output is available at separately gated bit lines.

3,618,052
BISTABLE MEMORY WITH PREDETERMINED TURN-ON STATE

Thomas Kwei, Wappingers Falls, and Robert M. Meade, Wassaic, both of N.Y., assignors to Cogar Corporation, Utica, N.Y.

Filed Dec. 5, 1969, Ser. No. 882,623
Int. Cl. G11c *11/40, 11/48*
U.S. Cl. 340—173 FF 31 Claims



This disclosure relates to a semiconductor memory arrangement wherein data is preset in a memory array so that there is no need for a supplementary memory, such as a read-only memory, to store the data to be preset. Each memory cell of the semiconductor memory array is predisposed to assume a specific information state upon each application of power thereto. By biasing memory cells in this manner, the desired information is available either upon initial operation or upon the restoration of power subsequent to any power lapse or upon a desired program reset. Hence, a semiconduc-

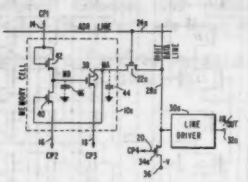
tor memory array is provided which is operable as a Read-Only memory and yet can also function as a Read/Write memory. By writing information into the cells of the array regardless of the initial information state thereof, a Read/Write memory operation is superimposed onto a functioning Read-Only memory.

3,618,053

TRAPPED CHARGE MEMORY CELL

James R. Hudson, Charlestown, and John G. Gregory, White Marsh, both of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 31, 1969, Ser. No. 889,604
Int. Cl. G11c *5/02, 11/40, 7/00*
U.S. Cl. 340—173 R 12 Claims



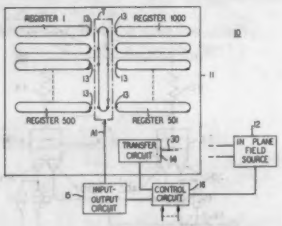
A memory cell comprised of three metal oxide semiconductive field effect transistors (MOSFET) coupled to the word address line and a digit data line of a binary digital memory array through a fourth metal oxide semiconductive field effect transistor. The cell is operated by three clocked supply potentials to allow the three MOSFETs to be selectively turned "on" and "off" enabling a charge to be trapped at one of the two circuit node capacitances. Also, the digit data line includes means for being precharged to a predetermined level during an initial portion of the read mode for providing nondestructive readout of the logic state of the memory cell. The memory cell includes a "refresh" mode of operation wherein the three phase clocked supply potential restores the charge state of the node capacitance having a charge thereon to a full charge thereby restoring any charge decay which would occur over long time intervals.

3,618,054

MAGNETIC DOMAIN STORAGE ORGANIZATION

Peter I. Bonyhard, Newark; Umberto F. Gianola, Florham Park, and Anthony J. Perneski, Martinsville, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 10, 1969, Ser. No. 875,338
Int. Cl. G11c *11/14, 21/00*
U.S. Cl. 340—174 TF 8 Claims



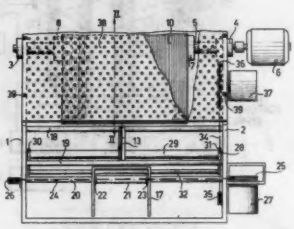
A single wall domain propagation arrangement herein includes magnetically soft overlay patterns which generate magnetic poles in response to reorienting inplane fields to move domains in propagation channels defined thereby. The arrangement is organized for high packing density and fast access by providing parallel recirculating bit channels to move consecutive binary word representations to a common recirculating channel. The common channel moves the word to a common read-write area. Information moves synchronously in the common channel, as well as in the parallel channels, permitting the return of information to the parallel channels with little logic circuitry.

3,618,055

FLEXIBLE DISC MAGNETIC MEMORY SURROUNDED BY A PERFORATED DRUM

Paul Antonius Ferdinand Van Acker; Wilhelmus Petrus Antonius Joosen, and Johan Adriaan Rietdijk, all of Emmasingel, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 29, 1969, Ser. No. 854,157
Claims priority, application Netherlands, Aug. 31, 1968, 6812450
Int. Cl. G11b *1/00*
U.S. Cl. 340—174.1 E 7 Claims



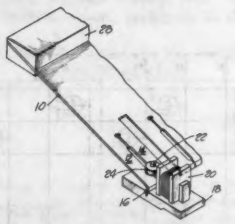
A magnetic flexible disc memory where the discs are mounted on a rotatable shaft and are provided with apertures in their central areas. The rotating discs are surrounded by a perforated drum-shaped enclosure in order to provide a mechanical stabilization to the outer edges of the discs without the necessity for operation in a partial vacuum.

3,618,056

SPRING MOUNTING FOR FLYING MAGNETIC HEAD

Reinhard Hurlimann, Granada Hills, and Willard J. Opocensky, Glendale, both of Calif., assignors to The Singer Company

Filed Dec. 22, 1969, Ser. No. 887,414
Int. Cl. G11b *5/60, 21/20*
U.S. Cl. 340—174.1 E 2 Claims



A mounting for urging a flying magnetic head into close proximity with a rotating magnetic medium. The mounting includes a bifurcated leaf spring with tips that are bent to engage a V-slot in the top surface of the transducer bearing pad. A vertical pin, extending from the top surface of the bearing pad, engages the slot between the tines of the bifurcated spring to prevent the disengagement of the transducer from the spring.

3,618,057

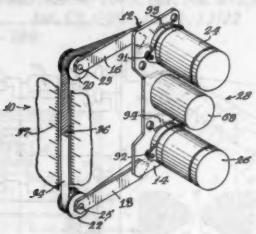
INSTRUMENT HAVING READOUT TAPE DRIVEN BY TWIN TORQUE RECEIVERS

Arthur J. Bromley, Lauderdale-By-The-Sea, Fla., assignor to McGraw-Edison Company

Filed May 26, 1969, Ser. No. 827,565
Int. Cl. G08c *19/00*
U.S. Cl. 340—198 11 Claims

An electrical instrument of the readout tape type comprises two synchro torque receiver units arranged to drive two reels in unison with a readout tape supported by the two reels and adapted to move in indicating relationship with a calibrated scale. The two torque receivers are mechanically

interconnected by the tape so that the rotors are angularly displaced from their null positions to tension the tape with a constant force regardless of the angular input signal. A solenoid-operated synchronizing device resets the torque



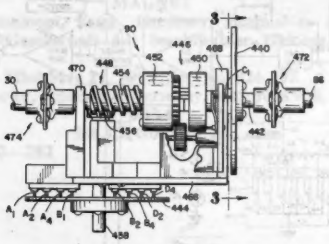
receivers to a midpoint of travel when the synchro system is deenergized. Also, gears may be provided between the two rotor shafts to retain the relative positions of the rotors and prevent unwinding of the tape when the synchro system has been deenergized.

3,618,058

ALTITUDE-REPORTING ENCODER SYSTEM

Earl W. Springer, Box 22, Fairland, Ind.

Division of Ser. No. 739,406, June 24, 1968, Pat. No. 3,513,708.
Filed Mar. 30, 1970, Ser. No. 23,579
Int. Cl. G08c *19/20*
U.S. Cl. 340—204 **4 Claims**



An altitude reporter comprising an altimeter, electro-optical means for tracking the position of the indicator of the altimeter, an encoder for registering the position of the indicator and providing pulse group series output corresponding to such a position, and means for operatively connecting the encoder to the electro-optical tracking means. This connecting means is effective, when the indicator moves in one direction, to operate the encoder to add increments of such movement and, when the indicator moves in the opposite direction, to operate the encoder to subtract like increments of movement. The encoder and the stepper motors which drive the encoder in response to electrical signals from the electro-optical means constitute a register.

3,618,059

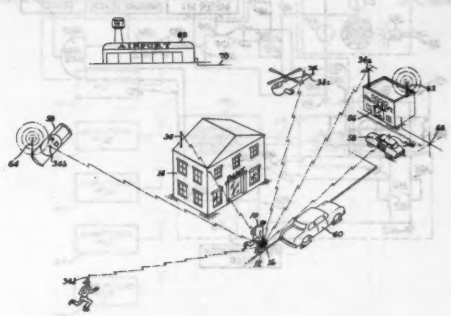
ELECTRONIC DETECTION AND TRACING MEANS

Milton F. Allen, 551 E. College Ave., Decatur, Ga.

Filed June 19, 1968, Ser. No. 738,266
Int. Cl. G08b *5/22*
U.S. Cl. 340—224 **7 Claims**

Electronic detection and tracing means including a tracing system embodying a miniature radio warning transmitter capable of being attached to a carrier such, primarily, as a package of money or other valuables within which it may be concealed, and the theft of which from a storage location may be anticipated, together with one or more radio-monitoring receives arranged remote from the package to detect unauthorized removal of the package, the escape route taken by the thief, and the location of the package and of the thief, the warning transmitter being controlled by means of a magnet concealed adjacent to the storage location to (automatically) broadcast from the package a continuous warning and detection signal when the package is removed from such location.

Upon receiving such signal, monitor receivers, located at the scene of the theft or stationed along likely escape routes,



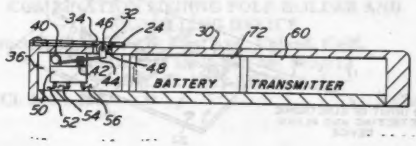
provide an audible alarm, and may operate warning lights, cameras, coded alarms or the like. Such audible and visual alarms may continue until manually shut off so as to give continuous notice that the package has been removed or, in the case of more remotely located receivers, that the package had passed or come into range, even though no present signal was being received from the transmitter.

3,618,060

CASH DRAWER BURGLARY ALARM

Anthony A. Nina, Philadelphia, Pa., assignor to Electro-Nite Co., Philadelphia, Pa.

Filed May 19, 1969, Ser. No. 825,592
Int. Cl. G08b *13/14*
U.S. Cl. 340—224 **3 Claims**



A cash drawer burglary alarm system wherein the removal from a cash drawer of a bill of currency lying between a plate with an opening therein and a switch biased to extend through the opening will cause an alarm to be actuated.

3,618,061

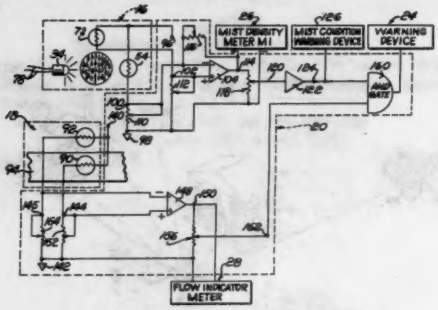
MONITORING APPARATUS FOR MONITORING THE DENSITY OF A MATERIAL CARRIED BY A FLUID AND THE FLOW OF THE FLUID

Joseph A. Livers, Roseville, Mich., assignor to Eaton Yale & Towne Inc., Cleveland, Ohio

Filed Apr. 30, 1969, Ser. No. 820,493
Int. Cl. G08b *19/00*
U.S. Cl. 340—236 **18 Claims**

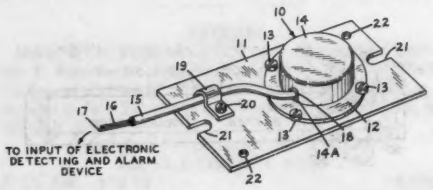
An improved monitoring apparatus for sensing the density of a material carried by a fluid in a conduit and the flow of the fluid to activate a warning device when the density of the material or flow of the fluid drops below a predetermined level. Such an improved monitoring apparatus includes means for sensing the density of the material carried by said fluid and is adapted to provide a signal proportional to the density to a circuit means and means for sensing the flow of the fluid for providing a signal dependent on the flow to the circuit means. The circuit means is adapted to receive these signals and is operable to activate the warning device when

either signal drops below a predetermined level. The means for sensing provides light to the conduit, a first sensor means



for detecting the light intensity and a second sensor for sensing the amount of light reflected by the material.

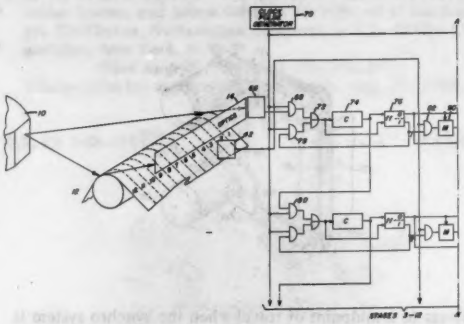
3,618,062
VAULT PROTECTION SYSTEM
Charles D. Ott, East Brunswick, N.J., assignor to American District Telegraph Company, Jersey City, N.J.
Filed Apr. 2, 1969, Ser. No. 812,689
Int. Cl. G08b *13/16*
U.S. Cl. 340—261 **10 Claims**



An electrical protection system of the acoustic type for bank vaults and like structures which provides means for collecting the sound from numerous points whereby adequate protection is provided for vaults of building block construction at far less expense than is possible under the prior art. The invention also permits operation at higher sensitivity levels while maintaining normal stability when used in conjunction with vaults of monolithic construction.

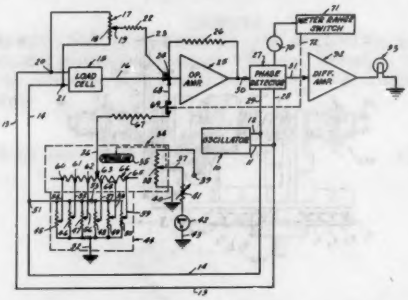
3,618,063
DEFECT INSPECTION APPARATUS
Robert F. Johnson, Victor, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Feb. 11, 1970, Ser. No. 10,360
Int. Cl. G01n *21/30*
U.S. Cl. 340—259 **8 Claims**

A web-scanning system is disclosed which is responsive to indicate the clustering of web defects. Digital words containing bits which correspond to defect signals in the respective portions of the web are applied serially to an accumulator in such a way that a bit causes the accumulator count to increase; and absence of a bit causes the accumulator count to decrease. Weighting the amount of increase to decrease has



the effect of controlling the degree of clustering necessary to provide the aforesaid indication.

3,618,064
CRANE COMPUTER
Martin W. Hamilton, Arlington Heights, Ill., assignor to Eaton Yale & Towne, Inc., Cleveland, Ohio
Filed Aug. 20, 1969, Ser. No. 851,606
Int. Cl. G08b *21/00*
U.S. Cl. 340—267 **5 Claims**

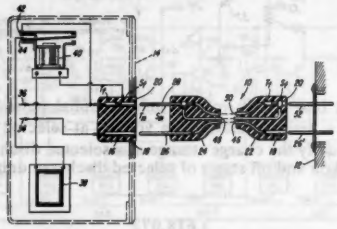


A crane load angle computer having a load cell to indicate the actual instantaneous load being sustained by a crane and for developing an electrical signal in response thereto. Means are also provided to develop an electrical signal which is indicative of the actual instantaneous angle of inclination of the crane, and means are provided to develop a signal indicative of the desired maximum loading of the crane at any specified angle. The circuit of the present invention combines the actual load signal with the instantaneous desired maximum signal at a specified angle and utilizes the resulting information to determine whether an alarm should be triggered. An angle potentiometer is provided which has a pair of resistor windings and associated movable contacts which are operated by a pendulum-type actuator. The contacts or wipers move along the respective resistors in accordance with the actual instantaneous angle of inclination of the crane. One of the angle resistors may have its output coupled directly to a meter so as to directly indicate the angle of the crane. The other angle resistor has a plurality of contacts spaced along the length thereof, and a series of potentiometers are coupled to each of these contacts. Each potentiometer provides an output signal which is indicative of the desired maximum loading of the crane at a specified angle which corresponds to the respective points of contact along the angle resistor. Therefore, as the pendulum-operated wiper moves along the resistor, it picks off the signal values which indicate the desired maximum loading at the respective angles of inclination. The alarm is triggered when this load-angle information exceeds a given relationship to the signal at the output of the load cell.

3,618,065
ANTITHEFT ALARM FOR APPLIANCES

Lucien H. Trip, Baltimore, and Michael J. Nusca, Ellicott City, both of Md., assignors to Trius Corporation, Ellicott City, Md.

Filed Nov. 4, 1969, Ser. No. 873,892
Int. Cl. G08b *13/14, 13/22*
U.S. Cl. 340—280 10 Claims

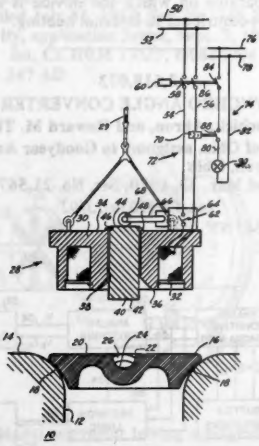


An antitheft alarm for appliances is provided consisting of a hold-in circuit which is completed through a special appliance cord and plug arrangement whereby a disconnection at either end causes a closed relay to drop out and sound an alarm.

3,618,066
ACTUATOR AND SIGNAL DEVICE FOR A LIFTING MAGNET

Harald Brommont, Essen, Germany, assignor to Heinrich Koppers Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed May 21, 1969, Ser. No. 826,398
Claims priority, application Germany, May 30, 1968, P 17 56 503.6
Int. Cl. G08b *21/00*
U.S. Cl. 340—282 8 Claims

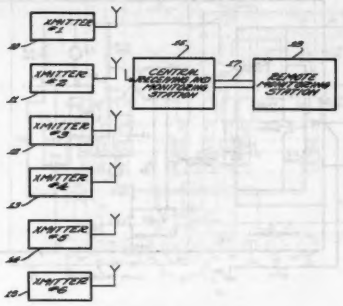


An electromagnet-lifting device employed to remove metallic charging hole covers includes a movable actuator member that has a length greater than the thickness of the magnet. When the bottom surface of the magnet is positioned on top of a charging hole cover the actuator is displaced upwardly relative to the magnet and closes a switch in the circuit to energize the magnet and engage the charging hole cover. A relay in the circuit closes a separate switch in another circuit to actuate a signal device that indicates the charging hole cover is engaged by the lifting device.

3,618,067
MOVEMENT DETECTOR

Donald P. DeVale, 9 S. Standish Road, Schaumburg, Ill., and Eugene F. Piraino, 386 Willow Road, Elmhurst, Ill., assignors to Donald P. DeVale and Eugene F. Piraino, part interest to each

Filed Nov. 4, 1969, Ser. No. 873,813
Int. Cl. B60r *25/10*; G08b *13/00*
U.S. Cl. 340—282 3 Claims

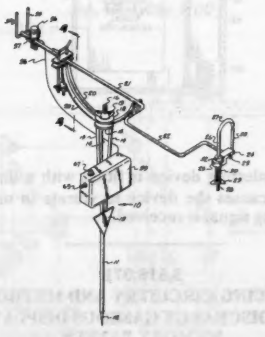


A motion detector for protecting items such as loaded trucks such as when parked in warehousing facilities which includes a transmitter affixed to the truck and which includes a tamperproof switch actuated by the truck frame or other portion such that if the truck is moved a given distance from its parked position or if the transmitter is removed from the truck an alarm will sound at a remote position which continuously monitors the output of the transmitter. The central monitoring position may simultaneously monitor a plurality of transmitters and may be interconnected with police or other remote monitoring authorities so as to assure continuous protection for the truck load.

3,618,068
COMBINATION FISHING POLE HOLDER AND SIGNALLING DEVICE

Clarence R. Sloan, 732 N. First Ave., Upland, Calif.

Filed Mar. 24, 1969, Ser. No. 809,612
Int. Cl. A01k *93/00*
U.S. Cl. 340—283 5 Claims

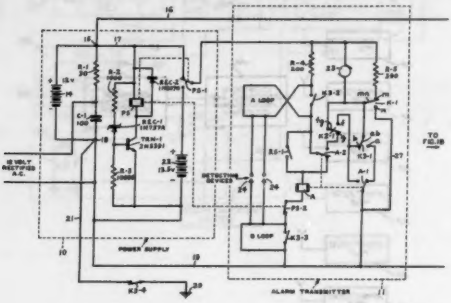


A fishing pole holder and alarm comprising a stake adapted to be inserted in the ground, a transverse pole support adjustably mounted on the stake, a switch carried by the outer end of the support, actuable upon depression of the pole, a visual and audible alarm connected to the switch, and a second switch for alternately actuating the visual or audible alarm.

3,618,069
MOTORIZED TRANSMITTER

Francis C. Evans, Staten Island, and Fred O. Johnson, Northport, both of N.Y., assignors to American District Telegraph Company, Jersey City, N.J.

Filed Oct. 31, 1968, Ser. No. 772,259
Int. Cl. G08b *13/02, 25/00*; H02J *9/04*
U.S. Cl. 340—292 **12 Claims**

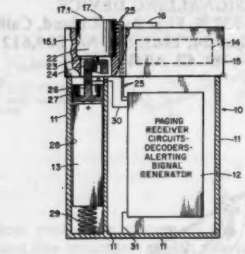


An electrical protection signaling system capable of producing alarm signals after the loss of the primary power supply. Signal interference caused by several transmitters operating simultaneously in the event of a power failure is avoided. A simplified circuit arrangement has been provided to permit operation of the system under electrical fault conditions and the need for manual rewinding of mechanically driven transmitters has been eliminated.

3,618,070
VIBRATORY ALERTING DEVICES

Sholly Kagan, East Natick, Mass., assignor to Bell & Howell Communications Company, Waltham, Mass.

Filed July 3, 1969, Ser. No. 839,034
Int. Cl. H04r *23/00*
U.S. Cl. 340—311 **15 Claims**



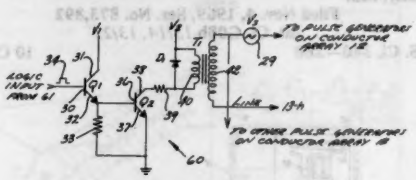
A vibratory alerting device is fitted with a linearly driven vehicle which causes the device to vibrate in unison with it when an alerting signal is received.

3,618,071
INTERFACING CIRCUITRY AND METHOD FOR MULTIPLE-DISCHARGE GASEOUS DISPLAY AND/OR MEMORY PANELS

William E. Johnson, and Larry J. Schmersal, both of Toledo, Ohio, assignors to Owens-Illinois, Inc.

Filed Jan. 19, 1968, Ser. No. 699,170
Int. Cl. G06k *15/18*
U.S. Cl. 340—324 **10 Claims**

An interface circuit and method for multiple-discharge gaseous display and/or memory panels utilizing the time characteristics of individual discharge units in a multiple-discharge panel to control the status of individual units without affecting the status of individual discharge units. A low-level voltage signal from an addressing logic system is

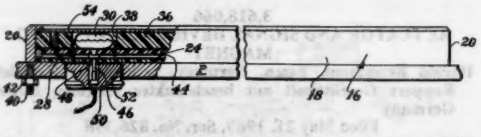


translated into a high-voltage unidirectional pulse which is added to a periodic alternating voltage at selected times to rapidly modify the charge storage at a selected discharge unit to control on and off states of selected discharge units.

3,618,072
THIN-LINE DIGICATOR DISPLAY

Bruce G. Kirkpatrick, Pompano Beach, and Rene F. De Groof, Fort Lauderdale, both of Fla., assignors to Discon Corporation

Filed Jan. 7, 1969, Ser. No. 789,443
Int. Cl. G09f *9/32*
U.S. Cl. 340—336 **10 Claims**

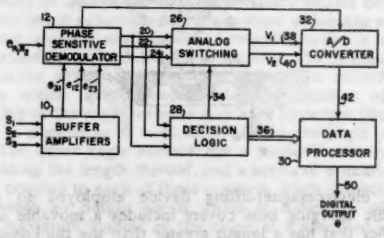


A thin, multisegment, incandescent lamp display which permits mounting of the device on the front surface of a control panel with no protrusions behind the front panel except wire or connecting terminations. Incandescent lamps with axially mounted filaments are directly viewed. The lamps are outside the apparatus on which the device is mounted and therefore do not contribute to internal heating.

3,618,073
SYNCHRO ANGLE CONVERTER

Stephen J. Domchick, Akron, and Howard M. Thomas, Canal Fulton, both of Ohio, assignors to Goodyear Aerospace Corporation, Akron, Ohio

Filed Mar. 23, 1970, Ser. No. 21,567
Int. Cl. H03k *13/02*
U.S. Cl. 340—347 SY **8 Claims**



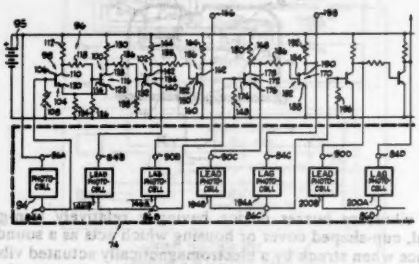
A synchro converter demodulates the stator signals, selects stator signal relationships indicative of a rotor-to-stator angular sector through logic switching, converts the selected signals in analog form to digital equivalents, and digitally processes the resultant signals to obtain an output representative of the synchro rotor-to-stator angular position.

3,618,074

OPTICAL ENCODER

John W. Brean, Cincinnati, Ohio, and Paul P. Stiedle, Little Rock, Ark., assignors to D. H. Baldwin Company, Cincinnati, Ohio

Filed Jan. 18, 1968, Ser. No. 698,739
Int. Cl. G08c 9/06
U.S. Cl. 340—347 P 5 Claims



This application discloses an analog to digital shaft angle encoder of the photoelectric type.

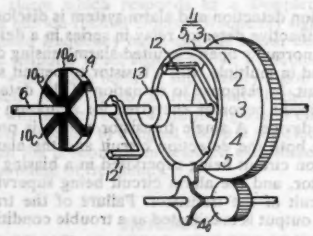
The encoder utilizes a code disc having a plurality of coaxial tracks of alternate transparent and opaque sectors. The code disc is disposed between a light source and a photocell assembly which utilizes a separate photocell confronting the least significant track of the code disc and a pair of photocells confronting each of the more significant tracks of the code disc. Only one of the photocells of the more significant tracks of the code disc is selected by a chain of cascade inverter stages in accordance with the output of the preceding less significant track of the code disc. The encoder includes an electronics unit coiled upon a flexible strip and affixed within a common housing.

3,618,075

ANALOG-DIGITAL CONVERTER

Akira Kaida, Tokyo, Japan, assignor to Sakura Sokki Kabushikikaisha, Tokyo, Japan

Filed July 31, 1968, Ser. No. 749,217
Claims priority, application Japan, Sept. 7, 1967, 42/76811
Int. Cl. H03k 13/20; G08c 9/04
U.S. Cl. 340—347 AD 2 Claims



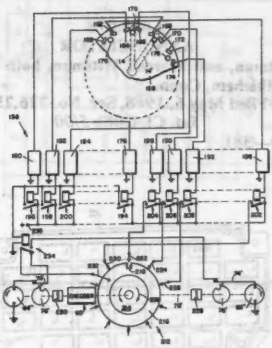
An analog-digital converter having a magnetic core, a plurality of windings wound on said magnetic core, said magnetic core being supplied with a multiphase alternating current to generate a rotating magnetic field, a magnetic path member disposed in opposite but spaced relation to said magnetic core and rotated in accordance with analog information, a detecting means for producing a pulse when said rotating magnetic field becomes aligned with said magnetic path member means for producing a reference pulse, and means for detecting the time difference between said pulse and reference pulse to convert analog information into digital information.

3,618,076

ALTITUDE REPORTER

Earl W. Springer, Box 22, Fairland, Ind.

Division of Ser. No. 739,406, June 24, 1968. Filed Nov. 6, 1969, Ser. No. 874,645
Int. Cl. H03k 13/02
U.S. Cl. 340—347 AD 13 Claims



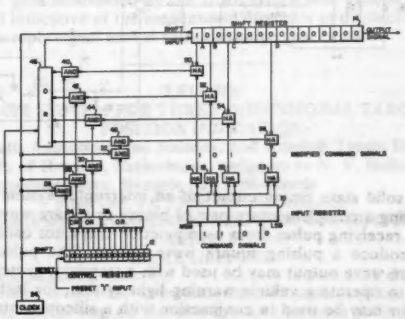
An altitude reporter comprising an altimeter, electrooptical means for tracking the position of the indicator of the altimeter first means including a register for registering the position of the indicator and providing pulse group series output corresponding to such a position, and second means for operatively connecting the first means to the electrooptical tracking means. This second means is effective, when the indicator moves in one direction, to operate the register to add increments of such movement and, when the indicator moves in the opposite direction, to operate the register to subtract like increments of movement. The tracking means is arranged so that it will, in no way, interfere with the free movement of the indicator of the altimeter. The system of the present invention, therefore, comprises a standard aircraft altimeter and means for reading the altimeter, which reading means is arranged so that it will, in no way, disturb or change the characteristics of the altimeter.

3,618,077

WALSH FUNCTION GENERATOR

Herbert L. Peterson, Hillcrest Heights, Md., assignor to The United States of America as represented by the Secretary of the Navy

Filed July 24, 1970, Ser. No. 58,012
Int. Cl. G08c 9/00
U.S. Cl. 340—348 8 Claims



A clock-driven generator which produces desired Walsh functions in response to binary number input command signals. These binary number input signals are modified to

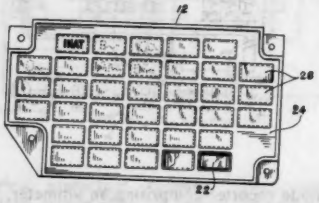
allow forward copying about the axes of symmetry of the Walsh functions as localized in a shift register, the serial output of which is the desired Walsh functions. Forward copying is accomplished by circuitry that includes half adders connected between the modified binary number input signals and the axes of symmetry of the shift registers and is controlled by a clock driven counter acting through AND gating circuitry.

3,618,078

ANNUNCIATOR

Samuel Wittman, and Marcell Wittman, both of RFD 1 Box 247 B, Bethlehem, Conn.

Filed May 6, 1968, Ser. No. 726,752
Int. Cl. G08b 5/00
U.S. Cl. 340—381 4 Claims



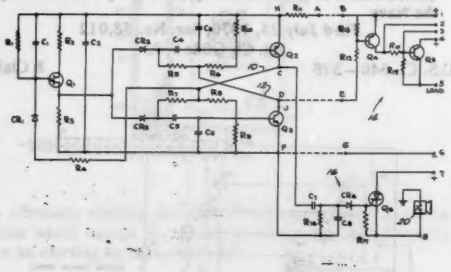
A multiple-signal annunciator which is compact in size and light in weight, comprising a relatively shallow, multiple-compartmented case having a printed circuit base, and a plurality of individually removable and replaceable lamp blocks pivotally mounted in said case and mechanically and electrically engaging said printed circuit.

3,618,079

SOLID STATE INTERRUPTER SYSTEM

Everett L. Denning, Jackson, Mich.; Dan Goor, Lexington; Frederick J. T. Dow, Billerica; Michael P. Greenberg, Winchester, Mass., and Poul H. Anderson, Jackson, Mich., assignors to Sparton Corporation, Jackson, Mich.

Filed June 20, 1968, Ser. No. 738,710
Int. Cl. G08b 3/00
U.S. Cl. 340—384 E 3 Claims



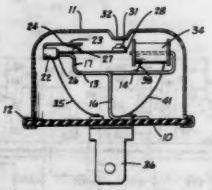
A solid state timing circuit of an interrupter system type utilizing a complementary pair of binary or square wave circuit, receiving pulses from a unijunction transistor oscillator to produce a pulsing square wave output. The pulse and square wave output may be used with a transistor switch circuit to operate a vehicle warning light system, for instance, and/or may be used in conjunction with a silicon controlled rectifier circuit for intermittently operating a vehicle horn. The silicon-controlled rectifier circuit utilizing the vibrating make and break contacts of a diaphragm-operated horn to switch the rectifier. Also, a short circuit protection circuit for the transistor switch circuit is disclosed.

3,618,080

LOW-ENERGY INPUT BUZZER

Cleon F. Frey, Sebastian, Fla., assignor to International Flasher Corporation, Bayamon, P.R.

Filed July 10, 1970, Ser. No. 53,827
Int. Cl. G08b 3/00
U.S. Cl. 340—396 4 Claims



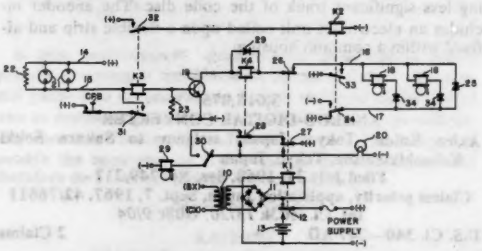
A vibratory buzzer device having a relatively thin-gage metal, cup-shaped cover or housing which acts as a sounding surface when struck by a electromagnetically actuated vibrating reed which strikes the cover through a hard, electrically insulating hammer element, the cover thus being electrically insulated from the buzzer circuit.

3,618,081

CONDITION DETECTION AND ALARM SYSTEM

John T. Morrow, Old Greenwich, Conn., assignor to Edwards Company, Inc., Norwalk, Conn.

Filed June 12, 1969, Ser. No. 832,741
Int. Cl. G08b 29/00
U.S. Cl. 340—409 1 Claim



A condition detection and alarm system is disclosed having a normally inactive detector relay in series in a detection circuit with a normally open-circuited alarm sensing device that is connected in multiple with a resistor to permit supervising of the circuit. In response to actuation of the detector relay, an alarm circuit becomes energized for actuation of at least one alarm device. A single transistor switch is provided for supervising both the detection circuit and the alarm circuit, the detection circuit being supervised in a biasing circuit for the transistor, and the alarm circuit being supervised in the output circuit of the transistor. Failure of the transistor to provide an output is manifested as a trouble condition.

3,618,082

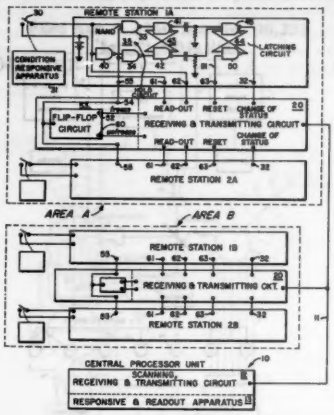
INFORMATION RETRIEVAL SYSTEM WITH A REMOTE STATION HOLD CIRCUIT TO PRESERVE A DOUBLE CHANGE IN STATUS

Roger J. Feulner, Mount Prospect, Ill., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Apr. 9, 1969, Ser. No. 814,702
Int. Cl. G08b 23/00, 29/00, 26/00
U.S. Cl. 340—413 8 Claims

An information retrieval system having a central processor unit which is connected over a transmission circuit to a plurality of remote stations wherein the status of any one of the remote stations which has a change in status can be indicated

or read out at the central processor unit. Each remote station has means for preserving a second change in status signal at a



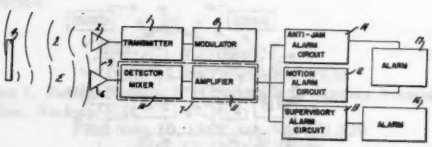
remote station until a first change in status is acknowledged by the central processor.

3,618,083

INTRUSION DETECTION APPARATUS HAVING ANTIJAMMING PROTECTION SYSTEM

Billy Burley; Frank S. Kett, Dallas; Geoffrey A. Young, Irving, and Paul I. Corbell, Dallas, all of Tex., assignors to Johnson Service Company, Milwaukee, Wis.

Filed Mar. 10, 1969, Ser. No. 805,622
Int. Cl. G01s *7/36, 9/42;* **G08b** *13/24*
U.S. Cl. 343—5 PD **9 Claims**



This disclosure includes an intrusion detection system with a motion alarm which responds to a Doppler frequency signal. The motion-related Doppler frequency signals cover a predetermined frequency band and the alarm circuit is constructed to respond to all signals above a selected minimum amplitude within such band. A supervisory alarm is also provided which responds to a frequency higher than any frequency within such band. A jamming alarm circuit is provided which responds to a signal above a selected amplitude greater than the motion alarm selected amplitude and essentially independent of frequency.

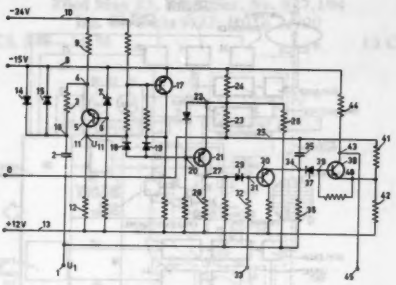
3,618,084

METHOD OF AND AN APPARATUS FOR ELIMINATING MISLEADING DOPPLER SIGNALS IN A DOPPLER RADAR SPEED-MEASURING SYSTEM

Rudolf Balsiger, Neuenhof, and Kurt Piechocki, Uster, both of Switzerland, assignors to Zellweger Ltd., Uster, Switzerland

Filed Nov. 25, 1969, Ser. No. 879,799
Claims priority, application Switzerland, Nov. 25, 1968, 17504
Int. Cl. G01s *9/44*
U.S. Cl. 343—7 A **20 Claims**

Method and apparatus for eliminating misleading Doppler signals in a Doppler radar speed-measuring system in which a measured value derived from the doppler frequency is differentiated to detect portions of the Doppler frequency in excess of a given threshold value which varies with the detected speed, and timing means is provided for controlling the period of time of receipt of proper Doppler signals, the time



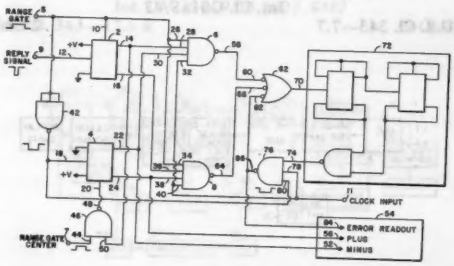
period of control also being varied in accordance with the measured speed.

3,618,085

ERROR DETECTOR FOR DIGITAL DME SYSTEMS

Thomas L. Hall, Ft. Wayne, Ind., assignor to Collins Radio Company, Cedar Rapids, Iowa

Filed Nov. 14, 1969, Ser. No. 876,619
Int. Cl. G01s *9/14, 9/56*
U.S. Cl. 343—7.3 **6 Claims**



This invention relates to an error detector for distance-measuring radio equipment (DME) comprising digital means for detecting a reply signal arriving at any time during the range gate established by the DME system and generating a signal indicative of the amount and direction of displacement of the reply signal arrival from the range gate center.

3,618,086

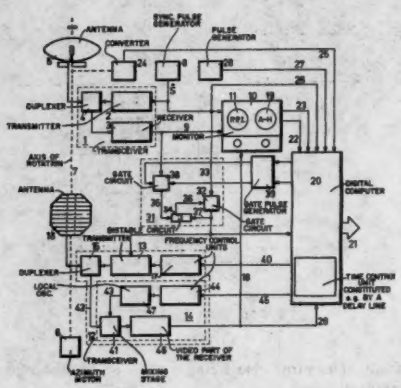
RADAR SYSTEM FOR THREE-DIMENSIONAL TARGET POSITION INDICATION

Cornelis Augustinus van Staaden, and Hendrik Teunis Huele, both of Hengelo, Netherlands, assignors to N. V. Hollandse Signaalapparaten, Hengelo (O), Netherlands

Filed Oct. 13, 1969, Ser. No. 865,609
Claims priority, application Netherlands, Oct. 18, 1968, 6814911
Int. Cl. G01s *9/02*
U.S. Cl. 343—7.5 **7 Claims**

A radar system for three-dimensional target position indication, comprising on the one hand an antenna radiating a beam, wide in elevation, and on the other hand a frequency-dependent antenna radiating a pencil beam. The scanning plane of the second antenna is substantially coplanar to the beam plane of the first antenna. Furthermore, the system is provided with a device, which in response to given target

signals received by means of the first antenna releases the transmitter of the second antenna to perform a scan during each pulse transmitted in the beam plane of said first antenna.

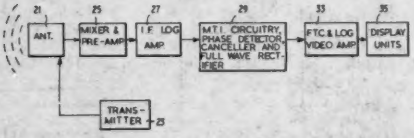


3,618,087

ANTICLUTTER RADAR RECEIVER

Frank Edward Smith, and Frederick Reginald Cross, both of Ottawa, Ontario, Canada

Filed Jan. 26, 1970, Ser. No. 5,489
Int. Cl. G01s 9/42
U.S. Cl. 343—7.7 **2 Claims**



The application discloses an anticlutter signal-processing radar receiver used as an air traffic control radar.

The radar receiver uses a single receiving channel including an intermediate-frequency logarithmic amplifier which operates without loss of phase information in a received signal, and the intermediate frequency output of which is applied to a phase detector effective to produce a bipolar video signal. The channel also includes a canceller and a full wave rectifier, arranged to eliminate ground clutter from the processed input signal and a fast-time-constant circuit in conjunction with a logarithmic video amplifier effective to reduce rain clutter in the processed input signal which enables a target signal, occurring in rain clutter in a received signal, to be observed.

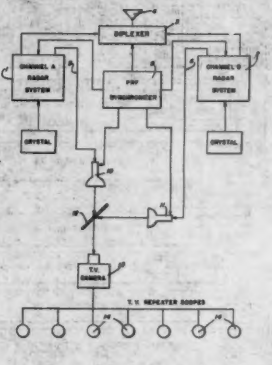
3,618,088

SECOND-TIME-AROUND ECHO IMMUNE RADAR SYSTEM

Thompson J. Simpson, Sr., Falls Church, Va., assignor to The United States Government as represented by the Administrator of the Federal Aviation Administration

Filed Feb. 26, 1970, Ser. No. 14,418
Int. Cl. G01s 7/06, 9/42
U.S. Cl. 343—7.7 **3 Claims**

A radar system for eliminating second-time-around echoes while simultaneously providing protection against radar "blind speed" problems. The invention provides two radar systems utilizing a common antenna and operating at two different frequencies and at two different pulse repetition rates.



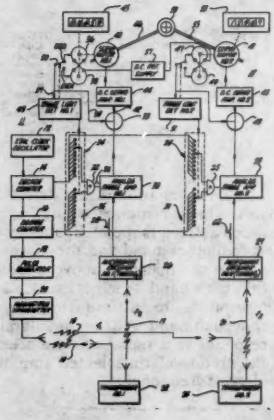
The video outputs from each system are combined to yield the target display.

3,618,089

RANGE AND TIME MEASURE SYSTEM

Robert B. Moran, Jr., Pasadena, Calif., assignor to Moran Instrument Corporation, Pasadena, Calif.

Filed Jan. 29, 1969, Ser. No. 794,937
Int. Cl. G01s 9/20
U.S. Cl. 343—13 R **17 Claims**



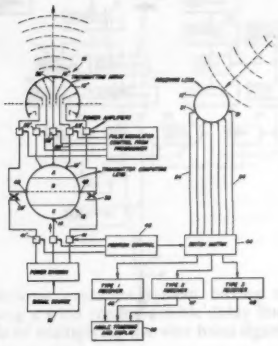
A precision range-measuring system combining digital and analog range-measuring techniques, operable on both a manual and automatic basis. The digital portion of the system is utilized to obtain the most significant digits of the range measurement and determines the amount of time delay after initiation of the range-measuring pulse before energization of the analog portion of the system. The analog portion is utilized to obtain the least significant digits of the range measurement. Readout of range information obtained by the system is provided by various means including direct display and a servo-plotting apparatus. Further refinements are incorporated to increase the accuracy of the analog portion of the system.

3,618,090

RADAR

John B. Garrison, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Navy

Filed Apr. 5, 1960, Ser. No. 20,231
Int. Cl. G01s 9/02
U.S. Cl. 343—16 R 16 Claims



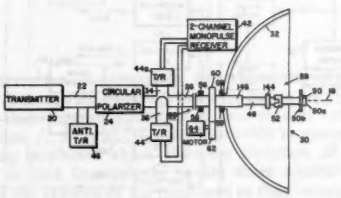
1. A radar comprising a spherical lens, wave-generating means, a plurality of feed means positioned adjacent the surface of said lens for applying the output of said wave-generating means at selected points on the surface of said lens, ans switching means for selectively connecting individuals of said feed means to said wave-generating means to transmit a beam of energy along an axis determined by the position upon the surface of said lens of the particular feed means selected.

3,618,091

CONICAL ANTENNA SYSTEM

Jesse L. Butler, Nashua, N.H., assignor to Sanders Associates, Inc., Nashua, N.H.

Filed Nov. 10, 1961, Ser. No. 151,529
Int. Cl. G01s 9/22
U.S. Cl. 343—16 M 24 Claims



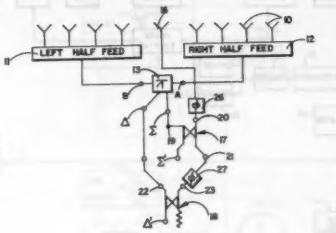
An antenna system comprising, in combination, antenna means radiating a single stationary beam pattern during transmission of energy said antenna means including means for receiving first and second overlapping beams within said first pattern, first and second transmission paths arranged to be energized upon reflections of said transmitted energy exclusively by signals in said first and second beams respectively, transmission means for coupling signals received by said antenna means to said transmission paths, and means for causing said overlapping beams to trace said directional pattern.

3,618,092

SIGNAL INJECTION APPARATUS FOR AVOIDING MONOPULSE ANOMALIES IN A MONOPULSE ARRAY

Douglas K. Waineo, Anaheim, Calif., assignor to North American Rockwell Corporation

Filed May 23, 1969, Ser. No. 827,194
Int. Cl. G01s 9/22; H01q 21/00
U.S. Cl. 343—16 M 13 Claims



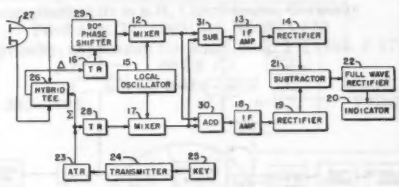
In a monopulse microwave system, means for avoiding monopulse anomalies by the injection of a received microwave sample into the monopulse difference channel, whereby the signal level of the difference channel sidelobe response is maintained above that of the sum channel.

3,618,093

OBSTACLE DETECTION RADAR SYSTEM

Frank R. Dickey, Jr, Dewitt, N.Y., assignor to The United States of America as represented by the Secretary of the Army

Filed Mar. 14, 1963, Ser. No. 265,598
Int. Cl. G01s 9/06, 9/22, 9/42
U.S. Cl. 343—17.1 R 9 Claims



4. A radar receiver comprising: an antenna having two vertically displaced feeds; a hybrid tee having a first input connected one of said feeds, a second input connected to the other of said feeds, and two outputs, a 90° shifter coupled to one of said hybrid tee outputs; a first mixer coupled to said phase shifter; a second mixer coupled to the other of said hybrid tee outputs; a local oscillator coupled to said first and second mixers; a first subtractor coupled to said first and second mixers; an adder coupled to said first and second mixers; a first IF amplifier coupled to said first subtractor; a second IF amplifier coupled to said adder; a first rectifier coupled to said first IF amplifier; a second rectifier coupled to said second IF amplifier; and a second subtractor coupled to said first and second rectifiers.

3,618,094

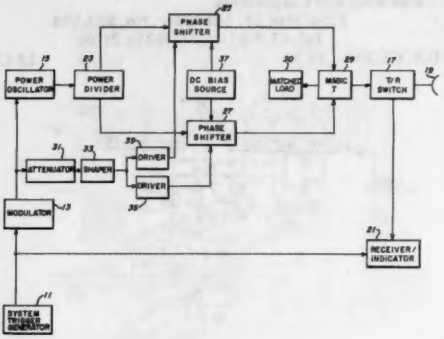
RADAR FREQUENCY SPECTRUM CONTROL CIRCUIT

Harold R. Ward, Bedford, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Oct. 30, 1969, Ser. No. 872,611
Int. Cl. G01s 7/28
U.S. Cl. 343—17.1 3 Claims

A pulse radar system wherein the frequency spectrum of each transmitted signal is narrower than the frequency spectrum of each pulse of radio frequency energy produced by the system's power oscillator. The desired narrowing is accomplished by providing means for amplitude modulating the

output signal from the system's power oscillator in such a way that substantially all of the radio frequency energy, except that which is generated during the main portion of each pulse, is inhibited from passing to the antenna.

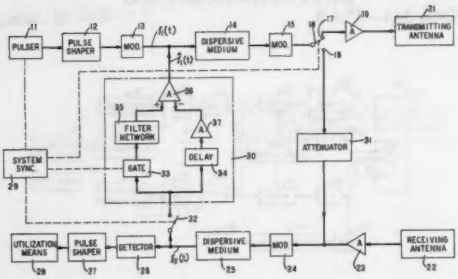


3,618,095

AUTOMATIC EQUALIZER FOR CHIRP RADAR SYSTEM

Sidney Darlington, Passaic Township, Morris County, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Nov. 10, 1969, Ser. No. 875,335
Int. Cl. G01s *7/28*
U.S. Cl. 343—17.2 PC **9 Claims**



In a Chirp radar system each dispersed signal pulse is diverted from the transmitter output power amplifier and antenna to the receiver where it is compressed by the receiver complementary dispersive line. The compressed pulse is processed, fed back to the transmitter dispersive line, and then conveyed to the transmitter output amplifier and antenna. By circulating and properly processing the pulse in the manner described, overall system distortions are substantially reduced.

3,618,096

METHOD AND APPARATUS FOR ELECTRONICALLY CAMOUFLAGING A MOVING MISSILE HAVING AN ACTIVE RADAR HOMING HEAD

Hellmuth Schoneborn, Assling, Germany, assignor to Messerschmitt-Bolkow-Blohm, Gesellschaft mit beschrankter Haftung, Munich, Germany

Filed Nov. 7, 1969, Ser. No. 874,818
Claims priority, application Germany, Nov. 26, 1968, P 18 10 977.8
Int. Cl. G01s *9/02*; **H04k** *3/00*
U.S. Cl. 343—18 E **10 Claims**

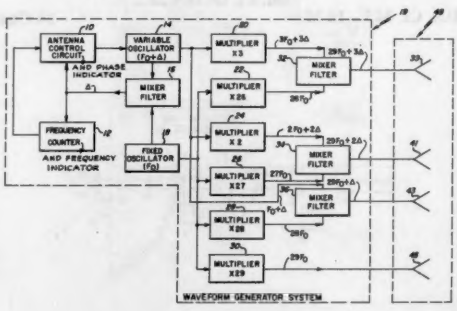
A method for electronically camouflaging a moving missile having an active radar homing head comprises utilizing a phantom transmitter, separate from the missile, to produce radar pulses having an operating wavelength differing only slightly from that of the radar homing head but having the same pulse recurrence frequency and a higher radiation power. The phantom transmitter is activated in advance of launching of the missile, and the radar homing head is activated after a predetermined flying time of the missile in a manner such that the transmission pulses from the phantom transmitter and those from the radar homing head arrive simultaneously at the target. The missile carries a receiver at the rear end tuned to the transmission frequency of the phantom transmitter, and circuitry connected to said receiver whereby the homing head produces radar pulses responsive to radar pulses received from the phantom transmitter. The circuitry includes a delay member, a ramp voltage generator and a release circuit, which are connected with a modulator controlling the radar homing head transmission, and the operability of the radar homing head is controlled by an additional transmit-receive switch.

3,618,097

ANTENNA ARRAY SYSTEM

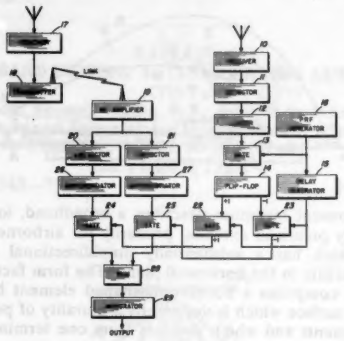
Willard W. McLeod, Jr., Lexington, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed June 17, 1963, Ser. No. 289,772
Int. Cl. H01q *3/26*
U.S. Cl. 343—100 SA **17 Claims**



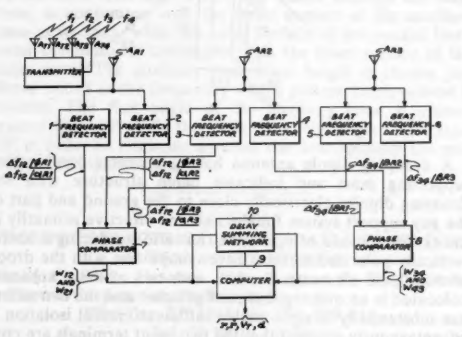
1. In combination:
first oscillator means for generating a first signal;
second oscillator means for generating a second signal;
means for obtaining frequency multiples of said first and second signals;
means for mixing predetermined multiples of said first signal with predetermined multiples of said second signal to derive a set of signals differing in frequency by an amount equal to the frequency difference between said first and second signals;
and means for varying the frequency of at least one of said first and second signals.

3,618,098
WIDE BAND DELAY LINE
Hilary H. Nall, Silver Spring, Md.
Filed Dec. 24, 1963, Ser. No. 333,230
Int. Cl. G01s 9/04
U.S. Cl. 343—100 CL 8 Claims



A triangulation-correlation system having an improved correlator using a wide range variable delay line and a multiplier capable of multiplying the wise band signals together.

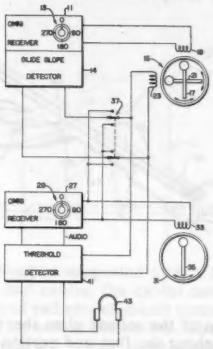
3,618,099
MISS DISTANCE DETERMINING HYPERBOLIC SYSTEM
Frank H. Johnson, Ridgewood, N.J.
Filed Nov. 28, 1969, Ser. No. 880,603
Int. Cl. G01s 1/04
U.S. Cl. 343—102 10 Claims



To determine continuously the minimum distance by which a first moving vehicle will travel past a second moving vehicle. there is transmitted from said second vehicle four frequencies, f_1, f_2, f_3 and f_4, which provide in space two sets of moving isophases which alternate direction of travel. A receiver at said first vehicle having three spaded antennas measures the velocity of the isophases as they sweep past said antennas by a phase comparison of the signals received at each antenna. The sum of the measured velocities corresponding to the alternating isophases and the measured velocity of the other isophases are coupled to a computer which determines therefrom the minimum miss distance.

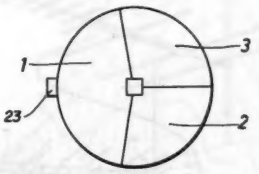
3,618,100
AIRCRAFT RADIO NAVIGATION APPARATUS
Harold Adler, Huckleberry Hill, Lincoln, Mass.
Filed Feb. 10, 1969, Ser. No. 797,820
Int. Cl. G01s 1/16
U.S. Cl. 343—107 4 Claims

The radio navigation apparatus disclosed herein facilitates perception by the pilot of an aircraft of passage through the intersection of preselected bearings relative to selected radio beacons. Deviation from one of the bearings is indicated on a first indicator having a pointer which swings laterally to indicate course deviation in conventional manner while departure from the second bearing is indicated on an indicator having a pointer which swings vertically and which crosses the pointer of the first indicator. The second indicator is



energized through a reversing switch which permits it to indicate progress relative to the intersection in the same manner for lateral locations of the respective radio beacon on either side of a course following the first bearing. Means are also provided for providing an audio signal, preferably the modulation of one of the received r.f. signals, as the intersection is passed.

3,618,101
COLLAPSIBLE PARABOLIC ANTENNA
Franz Emde, and Hans-Joachim Ludwig, both of Backnang, Wurttemberg, Germany, assignors to Telefunken Patentverwertungsgesellschaft m.b.H, Ulm/Danube, Germany
Filed Aug. 27, 1969, Ser. No. 853,423
Claims priority, application Germany, Aug. 27, 1968, P 17 91 007.5
Int. Cl. H01q 15/20
U.S. Cl. 343—705 9 Claims

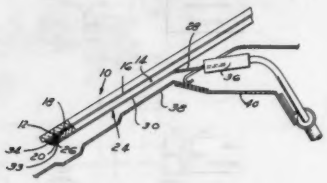


A collapsible parabolic antenna for use with a communications satellite. Two 100° reflector segments are rotated laterally by torsion springs and moved axially by a coil spring, so as to be brought into proper position with respect to a fixed 160° segment. The moveable segments are held in place in back of the fixed segment by electromagnetic or pyrotechnic devices that can be actuated by remote control to release the moveable segments at the appropriate time.

3,618,102
WINDSHIELD ANTENNA SYSTEM
Richard T. Dickason, Birmingham, and John A. Richardson, Harper Woods, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.
Filed Feb. 9, 1970, Ser. No. 8,913
Int. Cl. H01q 1/32
U.S. Cl. 343—713 3 Claims

A windshield antenna system includes a first sheet of glass, a second sheet of glass having a cutout portion along one

edge thereof overlying the first sheet of glass and an interlayer of resinous material bonding the two sheets of glass together. A pair of antenna wires are adhered to the interlayer for most of their length but they do have free ends projecting outwardly from between the bonded glass sheets at the cutout portion of the second glass sheet. A conductive terminal, for terminating the antenna wires, has a body portion secured to the exposed surface of the second glass sheet so that a first end portion of the terminal extends over the



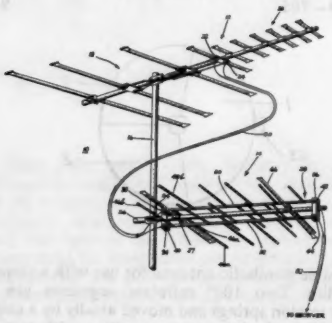
cutout portion of the second glass sheet. The antenna wires are wrapped about the first end portion of the terminal and the first end portion is deformed into the space formed by the cutout portion of the second glass sheet. Solder is placed on the antenna wires and the terminal to complete an electrical junction therebetween. A sealing material is placed over the junction. The second end portion of the terminal is bent away from the surface of the glass sheet and a connection is made to this end of the terminal for coupling the antenna to a radio receiver.

3,618,103

PLURAL ANTENNAS WITH IMPEDANCE MATCHING TO COUPLE TO SINGLE LEADIN

Robert S. Ringland, Burlington, Iowa, assignor to Antennacraft Company, Burlington, Iowa

Filed Oct. 24, 1969, Ser. No. 869,131
Int. Cl. H01q *21/00*
U.S. Cl. 343—727 **10 Claims**



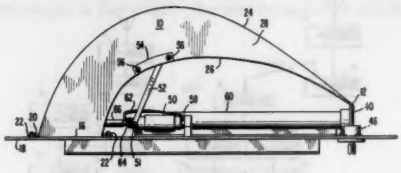
An antenna array including a narrow band antenna tuned to a particular frequency and a transmission line type broadband antenna having a frequency response range which includes the frequency of the narrowband antenna. The transmission line of the broadband antenna is serially coupled between the narrowband antenna and reception apparatus. A parasitic element of a predetermined length is positioned at a predetermined point along the transmission line of the broadband antenna and serves to peak the frequency of the narrowband antenna thereby to pass signals from the narrowband antenna to the reception apparatus with minimum attenuation.

3,618,104

BROADBAND CORNUCOPIA-TYPE ANTENNA SYSTEM

Lawrence V. Behr, Greenville, N.C., assignor to Multronics Inc., Rockville, Md.

Filed Feb. 26, 1968, Ser. No. 708,252
Int. Cl. H01q *9/00, 1/36, 1/48*
U.S. Cl. 343—745 **5 Claims**



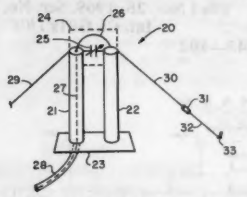
The present invention describes a broadband, low-profile circularly polarized antenna, primarily for airborne applications which has a substantially omnidirectional radiation characteristic in the horizontal plane. The form factor of the antenna comprises a cornucopia-shaped element having an arcuate surface which is defined by a plurality of polynomial line segments and which diverges from one terminal end to the other.

3,618,105

ORTHOGONAL DIPOLE ANTENNAS

Warren B. Bruene, and Ross L. Bell, both of Dallas, Tex., assignors to Collins Radio Company, Cedar Rapids, Iowa

Filed Mar. 6, 1970, Ser. No. 17,239
Int. Cl. H01q *21/26*
U.S. Cl. 343—747 **15 Claims**



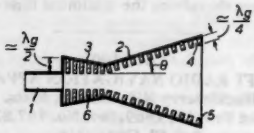
A drooping dipole antenna having a center combination supporting mast and indicator balun structure with the drooping dipoles electrically close to the ground and part of the guy support system for the antenna effective primarily in the skywave mode of operation, but also producing a useful vertically polarized surface wave component with the droop of the dipole elements. Further, with two of these antennas colocated in an orthongonal configuration and the two antennas substantially at right angles sufficient mutual isolation is advantageously attained that the two input terminals are connectable simultaneously to two transmitters, two receivers, or one transmitter and one receiver.

3,618,106

ANTENNA FEED SYSTEMS

Geoffrey H. Bryant, Ilford, England, assignor to The Plessey Company Limited, Ilford, England

Filed Nov. 10, 1969, Ser. No. 875,164
Claims priority, application Great Britain, Nov. 15, 1968, 54427/68
Int. Cl. H01g *13/02;* H03n *7/38;* H01g *13/06*
U.S. Cl. 343—772 **7 Claims**



An antenna feeder comprising a corrugated waveguide which affords on its inner surface a plurality of corrugated

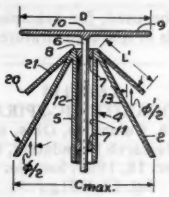
grooves in which the depths of successive grooves of the waveguide differ from each other so that the reflected impedance at the entrance of the grooves increases progressively from a low impedance afforded at the entrance of a groove at one end of the waveguide to a required higher impedance afforded at the entrance of a groove of the other end of the waveguide.

3,618,107

BROADBAND DISCONE ANTENNA HAVING AUXILIARY CONE

William M. Spanos, Wayne, N.J., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Mar. 9, 1970, Ser. No. 17,652
Int. Cl. H01q *13/00*
U.S. Cl. 343—773 **10 Claims**



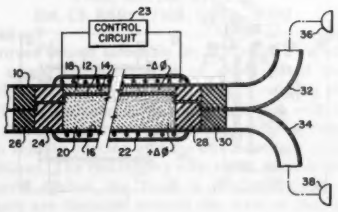
A broadband discone antenna arrangement for improving the elevation pattern of the basic discone antenna at frequencies many times the antenna cutoff frequency. An auxiliary conical element is added to the basic discone arrangement coaxially positioned between the main cone and the disc element. The inner surface of the outer conductor of the coaxial transmission feed line, which line passes through the main cone, is continuous with the outer surface of the auxiliary cone at its apex; while the outer surface of the coaxial line's outer conductor is continuous with the inner surface of the main cone. The auxiliary cone slant height is chosen just above cutoff at the frequency where pattern improvement is desired. The flair angle of the auxiliary cone is chosen greater than 60° while the main cone flair angle is less than 60° in order to minimize antenna size and optimize the pattern at the higher frequencies.

3,618,108

COMPACT ELECTRICALLY STEERABLE TRACKING ANTENNA FEED SYSTEM

Daniel C. Buck, Hanover, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 31, 1969, Ser. No. 889,416
Int. Cl. H01q *13/00*
U.S. Cl. 343—778 **6 Claims**



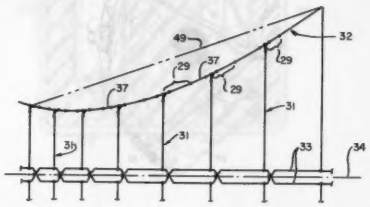
Described is an electrically steerable tracking antenna feed system employing a pair of ferrite phase shifters, one of which produces positive phase shift and the other of which produces negative phase shift with increasing applied magnetic field. The ferrite phase shifters, arranged in side-by-side relationship in a bifurcated wave guide, are surrounded by a common electromagnet.

3,618,109

ANTENNA CONSTRUCTION WITH EFFECTIVELY EXTENDED RADIATOR ELEMENTS

William L. Werner, Cupertino, Calif., assignor to Granger Associates, Palo Alto, Calif.

Filed July 23, 1968, Ser. No. 746,845
Int. Cl. H01q *11/10, 1/16, 1/20*
U.S. Cl. 343—792.5 **4 Claims**



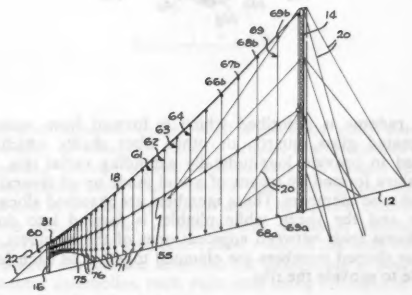
An antenna construction supported atop a support tower by means of booms and cables, the cables carrying the end portions of a number of radiator elements extending laterally from an axis defined by one of the booms. The end portions of the radiator elements are turned to be disposed along the length of the cables so as to electrically enlarge the effective size of the radiating array. In one embodiment, end portions of the radiating elements constitute structurally supporting portions of the cables, whereas in another embodiment the cable comprises a unitary continuous strand. The radiators can provide either L-shaped or T-shaped end portions.

3,618,110

MINIMUM-HEIGHT DIPOLE-TYPE VERTICALLY POLARIZED LOG-PERIODIC ANTENNA

Gerald Eldon Solberg, San Carlos, Calif., assignor to Technology For Communications International, Mountain View, Calif.

Filed July 7, 1969, Ser. No. 839,196
Int. Cl. H01q *11/10*
U.S. Cl. 343—792.5 **11 Claims**



A vertically polarized log-period antenna of the dipole type is disclosed, in which the top ends of all the dipole elements are directly coupled to the antenna's main support catenary. The antenna's feed line is used to perform a structural support function, so as to reduce the structural load which has to be supported by the main catenary. Consequently, a catenary with reduced sag is used, thereby reducing the maximum height of the main support tower.

3,618,111

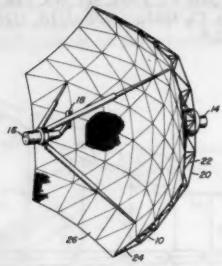
EXPANDABLE TRUSS PARABOLOIDAL ANTENNA

Desmond H. Vaughan, San Diego, Calif., assignor to General Dynamics Corporation, San Diego, Calif.

Filed Apr. 28, 1967, Ser. No. 634,700
Int. Cl. H01q *15/20*
U.S. Cl. 343—840 **21 Claims**

This invention relates to an expandable truss paraboloidal antenna structure in which the truss structure of the reflector

comprises hinged struts that form interconnecting, hinged, triangular truss modules that are aligned in two geometric planes with the struts terminating at junctions on the inner



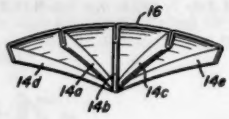
and outer surfaces of the paraboloidal shaped structure. The combination of hinge struts is packaged in a compact unit and then is deployed by being automatically unfolded outwardly by spring means in certain of the hinges.

3,618,112

RADOME AND METHOD OF MAKING SAME

Robert J. Grove, Coronado, and Merrill M. Reeder, Spring Valley, both of Calif., assignors to General Dynamics Corporation

Filed Mar. 23, 1970, Ser. No. 21,569
Int. Cl. H01q 1/42
U.S. Cl. 343—872 11 Claims



A radome is described which is formed from resin-impregnated glass, quartz, or other fiber sheets which are folded to provide longitudinally extending radial ribs. The folds are formed by means of a tool made up of several sector-shaped members. These members are matched along one edge and the sheet, while pliable, is formed into double thickness folds between adjacent ones of the members. The sector shaped members are clamped together as each fold is made to provide the ribs.

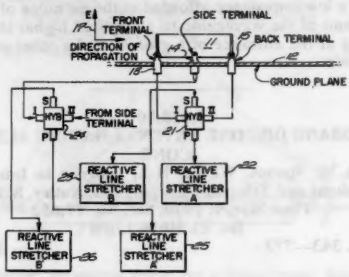
3,618,113

METALLIC STRUCTURE WITH COUPLED NETWORK TO REDUCE BACK SCATTERING

Andrew Alford, 299 Atlantic Ave., Boston, Mass.

Continuation of application Ser. No. 516,373, Dec. 27, 1965, now abandoned. This application Apr. 29, 1970, Ser. No. 31,825
Int. Cl. H01q 1/50
U.S. Cl. 343—885 6 Claims

The invention suppresses undesired radiation from objects having more than one dimension that is a significant fraction of a wavelength of energy exchanged with nearby radio antennas. Such a structure might be a hollow cylinder of height and transverse dimensions (diameter, if circular) that are a substantial fraction of a wavelength supported above and insulatedly separated from a ground plane by four terminals in space quadrature. At least two independently adjustable reactances are connected to the cylinder at points which are separated at some distance in the direction of wave propagation. If waves are expected to arrive from any direction, then a minimum of three independent reactances are required,



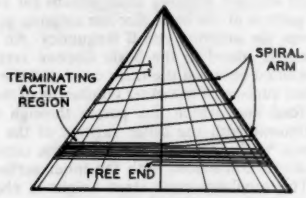
although four can be used, for example, one connected to each of the terminals in space quadrature.

3,618,114

CONICAL LOGARITHMIC-SPIRAL ANTENNA

Frederick J. Dietrich, Columbus, Ohio, assignor to The Ohio State University Research Foundation, Columbus, Ohio

Filed Dec. 16, 1968, Ser. No. 784,015
Int. Cl. H01g 1/36
U.S. Cl. 343—895 11 Claims



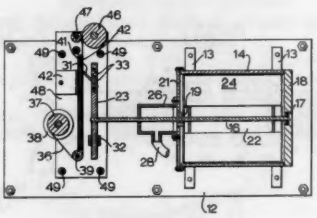
The invention is for an antenna of the conical logarithmic-spiral class. Specifically there is disclosed a means of utilizing a terminating active region to reduce the overall size of such an antenna by a factor of two without significantly modifying the antenna characteristics. Reference is made to the claims for a legal definition of the invention.

3,618,115

TERRAIN PROFILE RECORDER

Komad Parsazad, Attarzadh Street No. 83 1st Floor, Teheran, Iran

Filed July 17, 1969, Ser. No. 842,453
Int. Cl. G01c 7/04; G01d 9/38
U.S. Cl. 346—7 7 Claims



An instrument for simultaneously measuring the slope and distance traversed by a vehicle as an aid in determining the profile of the terrain over which a vehicle is driven, having particular utility in highway construction. A beam mounted parallel to the direction of travel of a vehicle carries a pen.

The beam is weighted so that it is parallel to the direction of travel and is horizontal. The pen marks chart paper which is advanced in proportion to the distance the vehicle moves and which is horizontal when the vehicle is level and tilts as the vehicle tilts. The pen marking the chart thus records the slope of the terrain and distance travelled. Damping means prevents overtravel of the pen or uneven terrain.

3,618,116

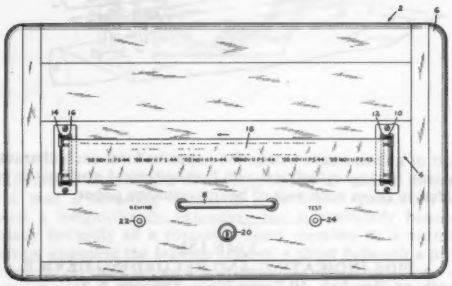
SIGNAL-RECORDING UNIT

Anthony C. Jr. LaMartina, Massapeque, N.Y., and Floyd L. Malmborg, Brookfield Center, Conn., assignors to American District Telegraph Company, Jersey City, N.J.

Filed July 7, 1969, Ser. No. 839,553

Int. Cl. G08b *25/00*

U.S. Cl. 346—59 **12 Claims**



A recorder for recording signals at a central station transmitted to said central station from remote stations, the recorder including a housing, tape supply and takeup spools, motors for feeding the tape and driving the takeup spool, a plurality of signal-receiving means each having means for receiving signals from a remote station, means on the signal-receiving means for recording signals received thereby on the tape, means for recording the date and time on the tape that the signal is received, means for feeding the tape while signals are being received and for continuing such feed for a predetermined time thereafter, and means for supplying current to the feeding and driving motors from an alternating current source when such source is available and from a direct current source when the alternating current source fails.

3,618,117

CRASH SENSOR AND RECORDER

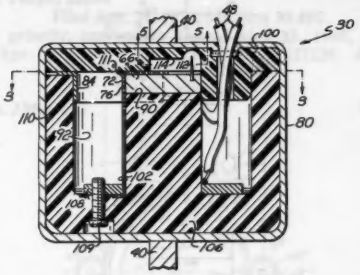
Hermann Kaiser, Detroit, Mich., assignor to Eaton Yale & Towne Inc., CLeveland, Ohio

Continuation-in-part of application Ser. No. 753,948, Aug. 20, 1968, now Patent No. 3,552,768. This application Apr. 7, 1969, Ser. No. 814,132

Int. Cl. B60r *21/08;* **G01p** *13/00*

U.S. Cl. 346—7 **26 Claims**

An improved sensor assembly for actuating a vehicle safety apparatus upon the occurrence of an accident includes a mass which is urged against an energy-absorbing stop by a plurality of resiliently yieldable contact fingers with sufficient force to prevent movement of the mass to an actuated position due to vehicle braking and the encountering of abnormal road conditions. The restraining effect that each of the spring fingers exerts against the mass is predetermined and the spring fingers are disposed around the mass so that upon the occurrence of an accident, the mass will move to its actuated position for any accident having a magnitude equal to or greater than a predetermined minimum magnitude over a wide range of directions of impact. A scribe is located on the mass and is operable to record an indication of the movement of the mass from its initial position. When an impact of a predetermined minimum magnitude or greater occurs, the mass moves against the influence of the contact fingers. This movement of the mass causes the contact fingers to engage a fixed contact while the scribe provides an indication of the



direction and magnitude of the impact. The engagement of the contact fingers and the fixed contact completes a circuit for effecting operation of the vehicle safety apparatus.

3,618,118

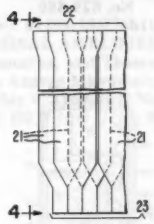
ELECTROGRAPHIC WRITING HEAD OF PLURAL PRINTED CIRCUIT CONSTRUCTION

William A. Lloyd, San Jose, Calif., assignor to Varian Associates, Palo Alto, Calif.

Filed July 28, 1969, Ser. No. 845,359

Int. Cl. G01d *15/06;* **H05k** *1/14, 3/20*

U.S. Cl. 346—74 ES **3 Claims**



An electrographic writing head is disclosed which employs a plurality of elongated flexible printed circuit boards each supporting thereon a portion of an array of closely spaced electrographic styli. Each circuit board is tapered from a wide end to a relatively narrow end. The narrow ends of the boards are arranged in side-by-side coplanar relation to define the exposed styli electrodes, whereas the wide ends of the boards contain the terminals for connecting to electrical connector assemblies, such wide ends being arranged in non-coplanar overlapping relation to accommodate connector assemblies.

3,618,119

COMPENSATION IN A MAGENTIC WRITE CIRCUIT

Juan A. Rodriguez, Boulder, Colo., assignor to Storage Technology Corporation, Boulder, Colo.

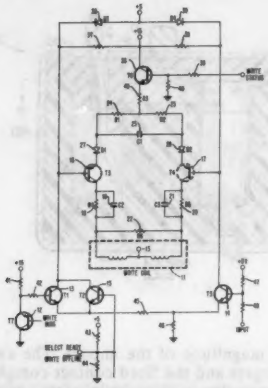
Filed Mar. 13, 1970, Ser. No. 19,156

Int. Cl. G11b *5/02, 5/44*

U.S. Cl. 346—74 M **8 Claims**

In a magnetic tape recording system, the write driver circuit has write compensation which drives the write coil with current which is initially high and which has an exponentially decaying waveform from the high current level to a lower current level. The write compensation is used with phase-encoded write current signals which have short duration transitions and longer duration transitions. The write compensation circuit includes a resistance-capacitance network having a time constant such that the exponential decay from the

high current level to the lower current level is not completed during the short duration transitions in the write current

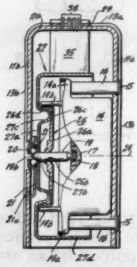


signal so that the current through the write coil is initially higher after a longer transition than after a short transition.

3,618,120
MAGNETIC DRUM ASSEMBLY

Richard B. Hanbicki, Princeton Junction, N.J., assignor to Madatron Corporation, Rocky Hill, N.J.

Continuation-in-part of application Ser. No. 731,421, May 23, 1968, now abandoned. This application May 15, 1969, Ser. No. 829,850
Int. Cl. G01d *15/12*; G11b *5/48, 5/76*
U.S. Cl. 346—74 MD **10 Claims**



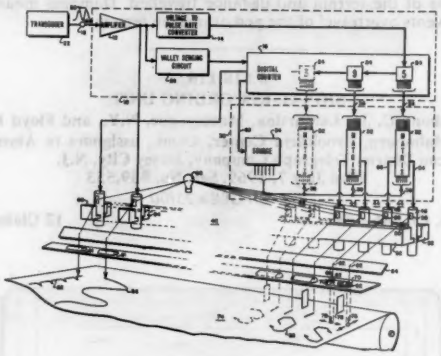
A compact, lightweight magnetic drum assembly driven by synchronous motor means. The motor and drum assembly are respectively supported by separate mounting plates. A shaft for rotatably mounting the drum assembly is supported in a recess provided in the drum assembly mounting plate. The drum assembly is rotatably mounted upon the shaft. The rotor assembly is directly mounted upon and secured to the drum assembly so that the two components effectively form one rotating assembly. One of the mounting plates adjustably receives a magnetic head assembly, the adjustability allowing proper alignment of the magnetic heads relative to the magnetic surface of the drum as well as providing the proper air gap therebetween.

3,618,121
ALPHANUMERIC PRINTER

Fritz Baur, Denver, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Aug. 26, 1964, Ser. No. 392,233
Int. Cl. G01d *9/42*
U.S. Cl. 346—109 **3 Claims**

This invention relates to a printing apparatus for printing a plurality of alphanumeric characters on a light-sensitive paper. A digital voltmeter and a character generator provide waveforms indicative of an input signal to a plurality of pairs of galvanometers. A pair of light beams are reflected by each

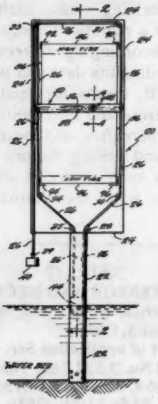


pair of galvanometers onto the paper to form each character. A lens having cylindrical and hemispherical portions is provided to focus each pair of beams onto the paper.

3,618,122
TIDE INDICATING AND RECORDING DEVICE

Anthony Maschak, 40 Torre Place, Yonkers, N.Y.

Filed June 26, 1970, Ser. No. 50,080
Int. Cl. G01f *23/08*; G01d *9/26*
U.S. Cl. 346—72 **10 Claims**



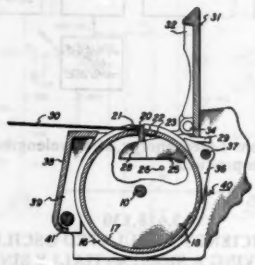
A device for indicating and/or recording the rise and fall of liquids, such as tides, comprises a backing member made of ferromagnetic material and disposed in a vertical plane with a magnetic marker movably held against the backing member by magnetic forces. The marker is operatively connected through a marker carrier to an actuating system including pulleys, weight means and float means with the float means being disposed so as to rise and fall with changing water levels to raise and lower the marker carrier. The marker carrier is provided with an undulating generally horizontally extending path receiving the marker and designed to impart horizontal and vertical movement components to the marker in step-by-step fashion with each changing tide, whereby such movements may be translated into a graph or chart on recording paper providing a visual indication and record.

3,618,123

FACSIMILE DRUM CONVEYOR

Gerald A. Buddendeck, Rochester, N.Y., assignor to Xerox Corporation, Rochester, N.Y.

Filed Dec. 26, 1968, Ser. No. 786,919
Int. Cl. G01d *15/28*; H04n *1/08*
U.S. Cl. 346—138 2 Claims



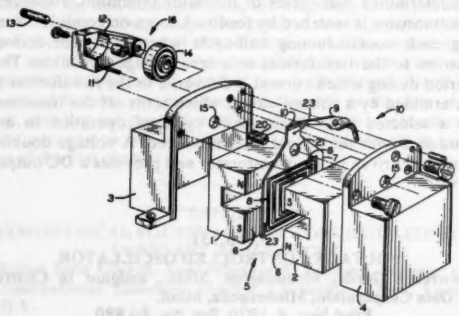
Apparatus suitable for conveying sheets of various dimensions past a scanning station in a facsimile transceiver in which a longitudinally extending bar is resiliently biassed radially inwardly of a rotatable drum member to a normal position engaging the leading edge of a sheet between a projecting lip on the bar and a portion of the drum periphery. A resiliently biassed wiper bar extending longitudinally along the drum periphery holds a sheet tautly against the drum periphery at the scanning station as the drum is rotated. An access door over the drum when opened beyond a predetermined position permits attachment or removal of a sheet from the drum by pivoting a cam to engage the bar member as the drum is rotated to a predetermined position of rotation.

3,618,124

FACSIMILE TRANSDUCER

Robert H. Dreisbach, Fort Wayne, and Russell L. South, New Haven, both of Ind., assignors to The Magnavox Company, Ft. Wayne, Ind.

Filed Apr. 18, 1969, Ser. No. 817,510
Int. Cl. G01d *15/20*; H04n *1/24*
U.S. Cl. 346—141 12 Claims



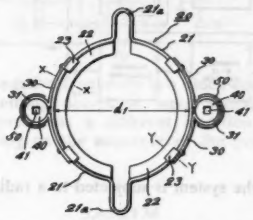
The disclosure describes an improved facsimile writing head of the moving coil type and particularly relates to an arrangement for providing a moving coil structure having low friction positioning and bearing surfaces and for providing mechanical damping of undesired oscillations and vibrations of the structure.

3,618,125

DEFLECTION YOKE

Koji Yabase, Tokyo, Japan, assignor to Denki Onkyo Co., Ltd., Tokyo, Japan

Filed Apr. 21, 1970, Ser. No. 30,455
Claims priority, application Japan, Apr. 23, 1969, Apr. 23, 1969, Apr. 23, 1969, Apr. 24, 1969; 44/37226, 44/37227, 44/37228, 44/37989
Int. Cl. H01f *1/00*
U.S. Cl. 335—212 8 Claims



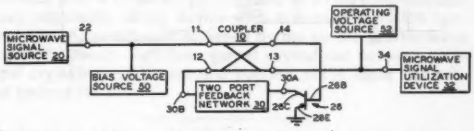
A deflection yoke for a television receiver set wherein a ring insulating cover having spring means is mounted on an outer periphery of an enlarged edge of a horizontal deflection coil of saddle shape and a rotary corrective magnet is mounted on the cover.

3,618,126

MICROWAVE SIGNAL AMPLIFIER WITH FEEDBACK

Carl W. Gerst, Skaneatles, and Thomas L. Sly, Clay, both of N.Y., assignors to Anaren Microwave, Inc., Syracuse, N.Y.

Filed May 8, 1969, Ser. No. 822,974
Int. Cl. H03f *3/60*, *1/36*; H01p *5/14*
U.S. Cl. 330—53 10 Claims



A microwave signal amplifier includes a common emitter transistor amplifier for transmitting a microwave signal from a source of microwave signals to a microwave utilization device. The transistor is connected in series with a phase shifting means between one output port and one input port of a four-port quadrature coupler. The input microwave signal is received at the other input port and the amplified microwave signal is transmitted from the other output port of the coupler.

3,618,127

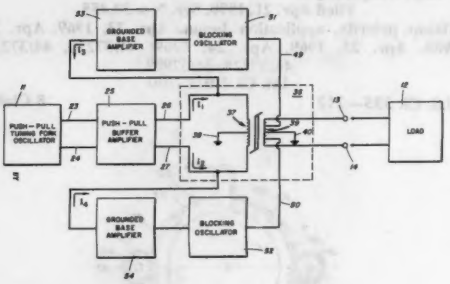
RADIATION-HARDENED PULSE-PRODUCING SYSTEM

Eric K. Pritchard, Adelphi, Md., assignor to the United States of America as represented by the Secretary of the Navy.

Filed July 18, 1969, Ser. No. 843,119
Int. Cl. H03b *5/04*
U.S. Cl. 331—54 6 Claims

A radiation-hardened pulse-producing system having an oscillator, a buffer amplifier and a saturable core transformer for producing output pulses. Current feedback loops from the output winding of the transformer to the input winding of

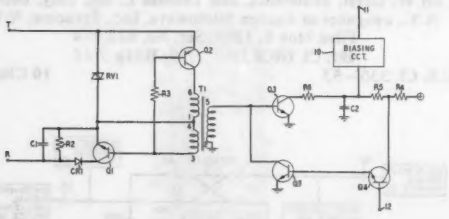
the transformer, including blocking oscillators, insure at least a predetermined time delay between output pulses will be maintained if the system is subjected to a radiation environment.



3,618,128
TWO-WAY SIGNALING CIRCUIT EMPLOYING A COMMON OSCILLATOR HAVING A FEEDBACK TRANSFORMER TOY PROVIDING DC ISOLATION BETWEEN SIGNAL SOURCES

George P. Houcke, Rumson, N.J., assignor to Bell Telephone Laboratories Incorporated, Murray Hill, Berkeley Heights, N.J.

Filed May 19, 1969, Ser. No. 825,624
Int. Cl. H03b *5/00*
U.S. Cl. 331—60 2 Claims



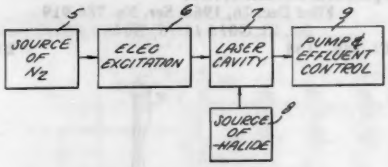
Two-way signaling between a line loop and local terminals is accomplished by directly applying the line loop signals to an oscillator to alternatively turn on and turn off the oscillator and by applying the local terminal signals across the secondary winding of a transformer whose primary winding is in the oscillator feedback circuit to modify the reflected impedance across the primary winding and thus alternatively turn on and turn off the oscillator. The loop signals are recovered by a circuit coupled to the secondary winding and the local signals are applied to the loop by a circuit coupled to the primary winding to provide duplex signaling and, by virtue of the transformer, direct current isolation.

3,618,129
LASER EMPLOYING SELECTED CYANOGEN HALIDES AS LASING GASES

Casper J. Ultee, Glastonbury, Conn., assignor to United Aircraft Corporation, East Hartford, Conn.

Filed Mar. 27, 1969, Ser. No. 811,700
Int. Cl. H01s *3/00*
U.S. Cl. 331—94.5 1 Claim

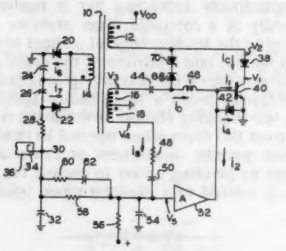
A gas laser utilizes essentially vibrationally excited nitrogen or carbon monoxide as an energizing gas and, through resonant collisions with a lasing gas, transfers the energy to the lasing gas, preferentially to an upper laser energy level. The lasing gas is a cyanogen halide including BrCN, ClCN or FCN, which is preferably introduced directly into the laser cavity free of prior excitation so as to avoid molecular decomposition. Laser energy at wavelengths between 5 and 10 microns is produced.



3,618,130
HIGH EFFICIENCY REGULATED OSCILLATOR CIRCUIT HAVING A SUBSTANTIALLY SINUSOIDAL WAVEFORM

Valdis E. Garuts, Beaverton, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed July 28, 1969, Ser. No. 845,217
Int. Cl. H03b *3/02*; H03k *3/30*
U.S. Cl. 331—109 18 Claims



A regulated oscillator circuit for producing a predetermined high voltage output employs a switching transistor for supplying current to a high-voltage transformer and for receiving feedback current from the same high-voltage transformer. A diode is placed in series between the switching transistor and the transformer primary such that the transistor conducts substantially no current at times during predetermined half-cycles of oscillator operation. However, the transistor is switched by feedback to an on condition during each nonconducting half-cycle whereby it will deliver current to the transformer in a zero voltage condition. The period during which current is delivered to the transformer is determined by a control circuit which turns off the transistor at a selected time during each cycle of operation in accordance with the output level produced. A voltage doubler circuit is driven by the transformer and provides a DC output level.

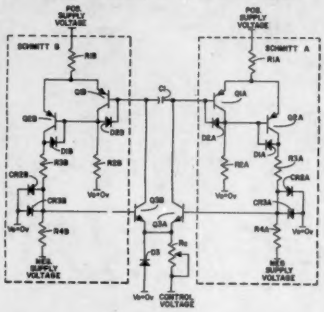
3,618,131
VOLTAGE CONTROLLED OSCILLATOR

Lawrence Garde, Bloomington, Minn., assignor to Control Data Corporation, Minneapolis, Minn.

Filed Nov. 4, 1970, Ser. No. 86,880
Int. Cl. H03k *3/282*
U.S. Cl. 331—113 10 Claims

A self-starting voltage controlled oscillator having a frequency which is a linear function of its control voltage and which uses two identical trigger circuits with a single capacitor connecting an input terminal of each trigger circuit to an input terminal of the other trigger circuit. Each trigger circuit may be a bistable Schmitt trigger. A pair of feedback loops connect the outputs from each trigger to its input. The other output from each trigger circuit controls a switch to change the capacitor charging signal path as the states of the triggers

change. The frequency of the oscillator is also a linear function of the capacitor value or of the resistor connected between the control voltage and the switch. The oscillator may be used in a phase lock loop circuit to lock on to and

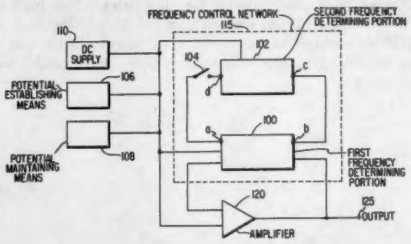


control the frequency and phase of an incoming signal from a read head used with a magnetic recording apparatus. It may also be used in any application where a controllable oscillator is required.

3,618,132
FREQUENCY SHIFT OSCILLATOR WHICH AVOIDS THE GENERATION OF TRANSIENTS

William Frederick Hingston, Cherry Hill, N.J., assignor to RCA Corporation

Filed May 23, 1969, Ser. No. 827,188
Int. Cl. H04l *27/12*
U.S. Cl. 331—179 **7 Claims**



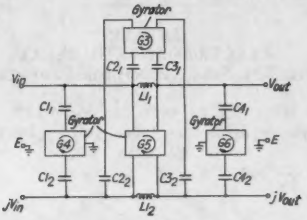
A frequency shift oscillator includes a first frequency-determining circuit whereby the oscillator normally functions at a first frequency. A second circuit having input and output terminals is arranged to be switched between predetermined points in the first circuit, shifting the frequency of the oscillator to a second frequency. The predetermined points in the first circuit and the input-output terminals of the second circuit are all maintained at substantially the same constant potential irrespective of whether or not the second circuit is switched between the predetermined points in the first circuit, avoiding the generation of transients which would otherwise occur upon the switching of the second circuit in and out of the first circuit.

3,618,133
SYMMETRICAL POLYPHASE NETWORKS UTILIZING CONSTANT REACTANCES

Michael John Gingell, Sawbridgeworth, England, assignor to International Standard Electric Corporaton, New York, N.Y.

Filed May 20, 1969, Ser. No. 826,149
Claims priority, application Great Britain, June 7, 1968, 27,161/68
Int. Cl. H03h *7/44*
U.S. Cl. 333—24 **19 Claims**

Symmetrical polyphase networks are disclosed comprising N single-phase networks each including a constant reactance, i.e, a reactance whose value remains constant with changes in the frequency of the signal applied thereto. Due to the use of this constant reactance (controlled constant current source, such as properly connected and controlled transistors, or impedance transformers), the polyphase network responds differently to input signals of negative and positive frequencies (a positive frequency is a counter-clockwise sequence of vectors representing polyphase input

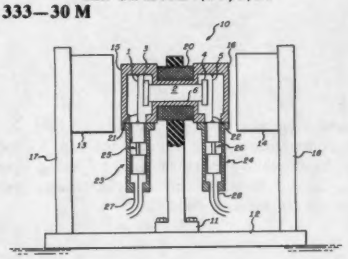


signals and a negative frequency is a clockwise sequence of vectors representing polyphase input signals). Also the polyphase network has a different insertion loss characteristic depending on the sequence of the polyphase input signals.

3,618,134
HIGH-FREQUENCY FERRIMAGNETIC DELAY DEVICE

Alan B. Smith, Lincoln, Mass., assignor to Sperry Rand Corporation

Filed Jan. 12, 1970, Ser. No. 2,010
Int. Cl. H03h *7/30, 9/30*
U.S. Cl. 333—30 M **7 Claims**

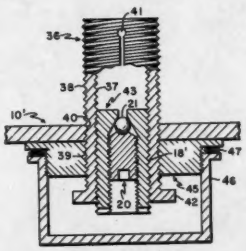


A microwave signal transmission device incorporating an axially magnetized cylindrical yttrium iron garnet rod operates over a broad frequency band as a two port, continuously adjustable, delay device with minimum insertion loss. Broad band operation is achieved by the use of quarter-wave plates of yttrium aluminum garnet crystal cut between principal crystallographic axes and bonded to the input and output ends of the rod.

3,618,135
VARIABLE CAPACITOR OF THE LOCKING TYPE

Carroll E. Weller, Cincinnati, Ohio, assignor to Avco Corporation, Cincinnati, Ohio

Filed Feb. 6, 1970, Ser. No. 9,220
Int. Cl. H01p *7/06;* **F16b** *39/06, 39/284*
U.S. Cl. 333—83 R **3 Claims**



The invention here disclosed is a variably positioned capacitance or susceptance element of particular utility in tuning striplines and cavities excited in the TEM mode. It is characterized by a bushing having an expansible segmented fore portion which projects through an aperture in the wall of

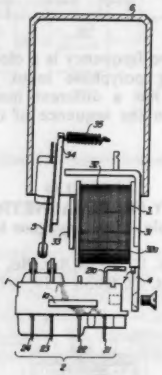
the device being tuned, together with a locking screw arranged to force the segments into the edges of said aperture, thereby to assure favorable electrical characteristics and a secure lock of the setting of capacitance or susceptance.

3,618,136

ELECTROMAGNETIC RELAY

Teizo Fujita, 3-34, Naka, Tezukayama, Sumiyoshi-ku, Osaka, Japan

Filed Jan. 27, 1970, Ser. No. 6,177
Claims priority, application Japan, July 19, 1969, 44/69002
Int. Cl. H01h 50/02
U.S. Cl. 335—202 3 Claims



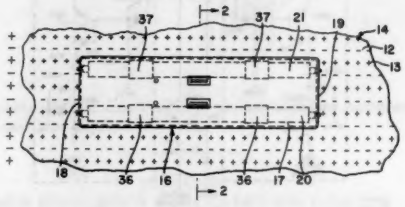
An electromagnetic relay so constructed that the internal electrical connection can be attained incident to assembly of the relay, by previously performing a soldering operation at one place for one terminal end of a coil or at a total of two places for both terminal ends of the coil.

3,618,137

MOVABLE MAGNETIC COUPLING

Raymond C. Bassett, 54 Holiday Drive, and William R. Chesnut, 37 Laurel Place, both of Caldwell, N.J.

Filed Feb. 2, 1970, Ser. No. 7,885
Int. Cl. H01f 7/20
U.S. Cl. 335—285 20 Claims



A movable magnetic coupling comprising a magnetized surface and a magnetized, movable rotor magnetically adhered to the surface, the surface having parallel, magnetic fields of alternate polarity which magnetically interact with similar, parallel magnetic fields of alternate polarity on the movable rotor, the magnetic interaction constantly aligning the rotor in a continuously parallel orientation with respect to a reference line in the surface yet permitting free translational movement of the rotor both by rotation about its axis and by sliding parallel to its axis without substantial magnetic resistance.

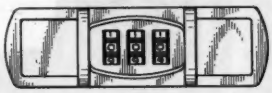
DESIGNS

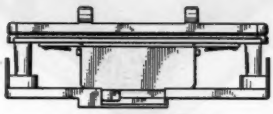
NOVEMBER 2, 1971

222,523
PAIR OF SKI GOGGLES
Terry J. Simpkins, Dublin, Ohio, and James P. Soroos, New Haven, Conn., assignors to Bausch & Lomb Incorporated, Rochester, N.Y.
Filed July 13, 1970, Ser. No. 23,917
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—234

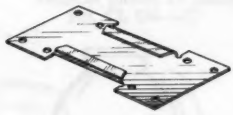
222,524
ELECTRIC SPOTTING BRUSH FOR CLEANERS
John Jedora, 33 Cedar N., Timmins, Ontario, Canada
Filed Mar. 13, 1970, Ser. No. 21,890
Term of patent 14 years
Int. Cl. D4—*02*
U.S. Cl. D4—14

222,525
COMBINATION LUGGAGE LOCK OR THE LIKE
Samuel J. Holtzman, 8201 Symphony Drive, Baltimore, Md. 21208
Filed Aug. 5, 1970, Ser. No. 24,317
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—129



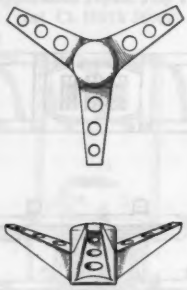


222,526
SNUBBER PLATE
William A. Meier, Roselle, Ill., assignor to Signode Corporation
Filed Mar. 27, 1970, Ser. No. 22,079
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—229



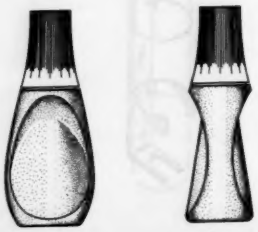
222,527
BRACKET FOR USE WITH LIFESAVING EQUIPMENT
Theodore Ziaylek, Jr., P.O. Box 292, Yardley, Pa. 19068
Filed Mar. 11, 1969, Ser. No. 16,186
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—247

222,528
SPINNER NUT
Edwin L. Schwartz, Los Angeles, Calif., assignor to Rite Autotronics Corporation, Los Angeles, Calif.
Filed May 8, 1970, Ser. No. 22,891
Term of patent 14 years
Int. Cl. D08—*10*
U.S. Cl. D8—273



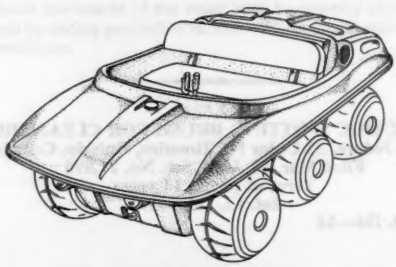
222,529
BOTTLE
Jonathan A. Terner, 17 Cornell St., Scarsdale, N.Y. 10583
Filed Sept. 25, 1970, Ser. No. 25,190
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—100

222,530
LIQUID DISPENSING BOTTLE
Warren J. Luedtke, Racine, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.
Filed Nov. 20, 1970, Ser. No. 26,097
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—144

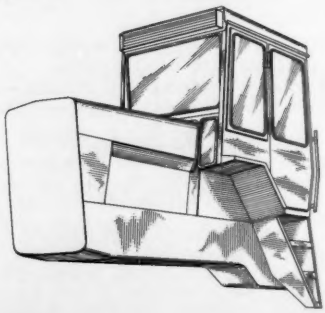


222,531
RETAIL FOOD MARKET
Howard Cooper, Suite 7707, John Hancock Center, Chicago, Ill. 60611
Filed Mar. 19, 1970, Ser. No. 21,972
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D13—1

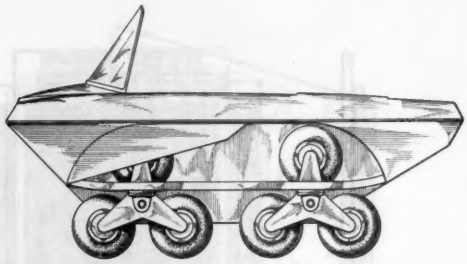
222,532
ALL-TERRAIN VEHICLE
Robert W. Temple, Boulder, Colo., assignor to Hitco
Filed Aug. 20, 1970, Ser. No. 24,604
Term of patent 14 years
Int. Cl. D12—*13*
U.S. Cl. D14—3



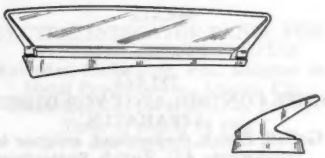
222,533
TRACTOR BODY
Leo J. Lorenz, Farmington, and Wilford E. Bean, Southfield, Mich., assignors to Massey-Ferguson Inc., Detroit, Mich.
Filed Aug. 21, 1970, Ser. No. 24,624
Term of patent 14 years
Int. Cl. D12—*09*
U.S. Cl. D14—3



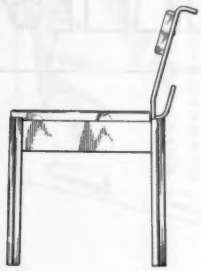
222,534
VEHICLE
John P. Forsyth and Robert W. Forsyth, Upland, Calif., assignors to Lockheed Aircraft Corporation, Burbank, Calif.
Filed Sept. 14, 1970, Ser. No. 24,982
Term of patent 14 years
Int. Cl. D12—*13*
U.S. Cl. D14—3



222,535
VEHICLE ROOF-TOP REAR VIEW MIRROR HOUSING
William W. Toy, Bloomfield Hills, and Lynn H. Hodge, Detroit, Mich.; said Toy assignor to Lewis G. Harmon, Birmingham, Mich.
Filed July 22, 1969, Ser. No. 20,421
(Filed under Rule 47(a) and 35 U.S.C. 116)
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D14—6

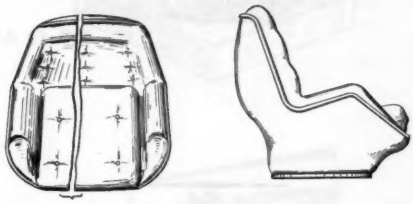


222,536
CHAIR
Frederick Clive Hunter and John Sidney Webb, Banbury, England, assignors to Design Furniture Limited, Banbury, England
Filed June 4, 1970, Ser. No. 23,302
Claims priority, application Great Britain Apr. 17, 1970
Term of patent 14 years
Int. Cl. D6—*02*
U.S. Cl. D15—1



222,537
SEAT
Marilyn Lewis, Beverly Hills, Calif., assignor to Hamburger Hamlets, Inc.
Filed Dec. 15, 1969, Ser. No. 20,495
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D15—8

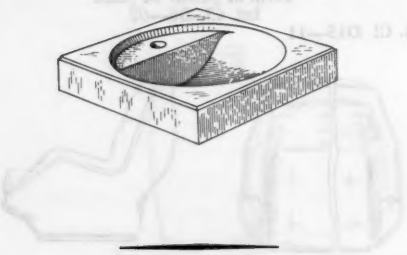
222,538
CHAIR
Charles Bernard, Montreuil-sous-Bois, France, assignor to Airborne S.A., Montreuil-sous-Bois, France
Filed Oct. 8, 1969, Ser. No. 19,454
Claims priority, application France Apr. 28, 1969
Term of patent 14 years
Int. Cl. D6—*02*
U.S. Cl. D15—11



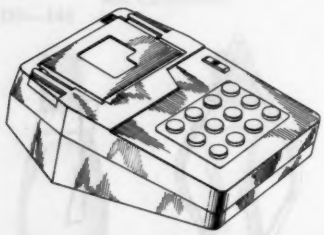
222,539
FISH LURE SPINNER
Dennis A. Visger, Box 93, New Albin, Iowa 52160
Filed June 1, 1970, Ser. No. 23,245
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—29

222,540
FOOT VALVE
John F. Campbell, Fergus, Ontario, Canada, assignor to GSW Limited—GSW Limitee, Toronto, Ontario, Canada
Filed June 8, 1970, Ser. No. 23,361
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—19

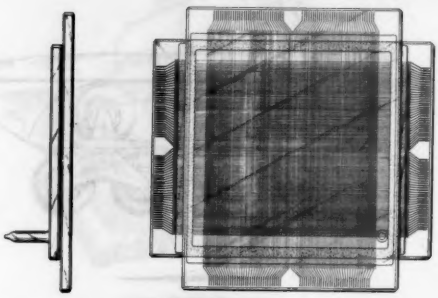
222,541
LAVATORY
Kay L. Ruggles and Norman J. Van Skyhawk, Salt Lake City, Utah, assignors to American Standard Inc., New York, N.Y.
Filed Nov. 12, 1968, Ser. No. 14,384
Term of patent 7 years
Int. Cl. D23—*02*
U.S. Cl. D23—58



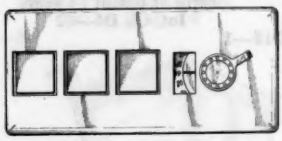
222,542
TEACHING MACHINE
Teruo Matsumoto, Tokyo, Japan, assignor to Epoch Company, Ltd., Tokyo, Japan
Filed Aug. 27, 1970, Ser. No. 24,720
Term of patent 14 years
Int. Cl. D19—*08*
U.S. Cl. D25—1



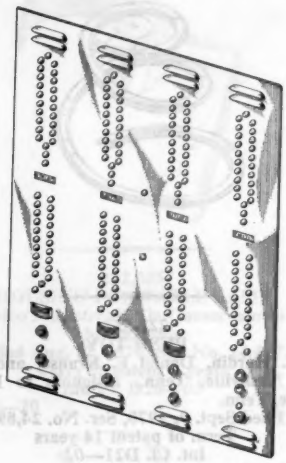
222,543
LIGHT EMITTING GAS DISCHARGE MATRIX DISPLAY PANEL
Harold J. Hoehn, 2255 Haven Wood Drive, Toledo, Ohio 43614
Filed Sept. 9, 1969, Ser. No. 19,075
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D26—5



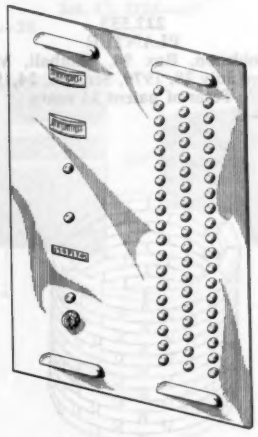
222,544
REMOTE CONTROL UNIT FOR DISPENSING APPARATUS
Fritz Gallati, Zurich, Switzerland, assignor to Mettler Instrumente AG, Zurich, Switzerland
Filed July 31, 1970, Ser. No. 24,244
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—13



222,545
ELECTRIC MULTIPLE INDICATOR PANEL FOR A PNEUMATIC TUBE SYSTEM
Herbert Kalendar, Miami, Fla., assignor to Advance Metal Products, Inc., Miami, Fla.
Filed Sept. 10, 1970, Ser. No. 24,908
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—13



222,546
ELECTRIC INDICATOR PANEL FOR A PNEUMATIC TUBE SYSTEM
Herbert Kalendar, Hallandale, Fla., assignor to Advance Metal Products, Inc., Miami, Fla.
Filed Sept. 10, 1970, Ser. No. 24,909
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—13

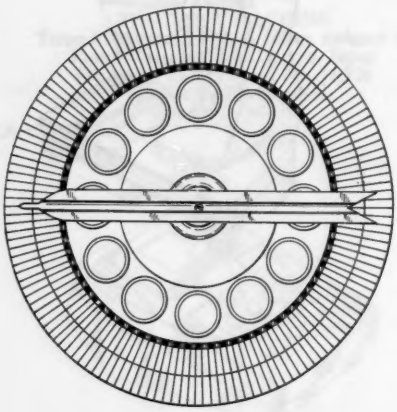


222,547
STEREOPHONIC HEAD SET
Bernard Kantor, South Farmingdale, N.Y., assignor to Stanton Magnetics, Inc., Plainview, N.Y.
Filed Aug. 24, 1970, Ser. No. 24,655
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D26—14

222,548
STATUETTE OR SIMILAR ARTICLE
Abbot Lutz, New York, N.Y., assignor to The Singer Company, New York, N.Y.
Filed Nov. 9, 1970, Ser. No. 25,867
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D29—23

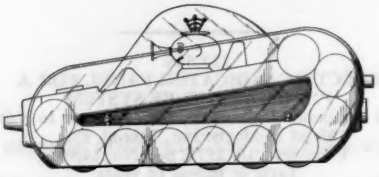
222,549
SPINNING INDICATOR DEVICE
Frank J. Faltico, Jr., 524 W. Surf St., Chicago, Ill. 60657
Filed Apr. 22, 1970, Ser. No. 22,560
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5

222,550
SPINNING INDICATOR DEVICE
Frank J. Faltico, Jr., 524 W. Surf St., Chicago, Ill. 60657
Filed Apr. 22, 1970, Ser. No. 22,561
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5

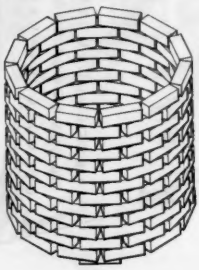


222,551
TOY VEHICLE TRACKWAY
Eijiro Tomiyama, % Tomy Kogyo Co., Ltd., 10, 9, 7-chome, Tateishi Katsushika-ku, Tokyo, Japan
Filed Apr. 22, 1970, Ser. No. 22,568
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—15

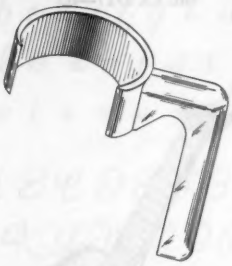
222,552
PUSH TOY
Charles H. Hardin, Daniel F. Krause, and Arnold E. Brown, Nashville, Tenn., assignors to Kusan, Inc., Nashville, Tenn.
Filed Sept. 9, 1970, Ser. No. 24,891
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15



222,553
PLANTER
Gerald V. Robinson, Box 94, Kimball, Minn. 55353
Filed July 28, 1970, Ser. No. 24,184
Term of patent 14 years
U.S. Cl. D35—3

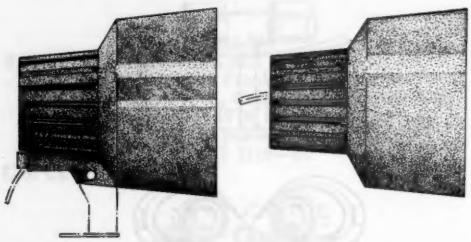


222,554
CAN HOLDER
Glen R. Cockrum, R.R. 1, Box 1342, Granite City, Ill. 62040
Filed Apr. 16, 1970, Ser. No. 22,465
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D44—21

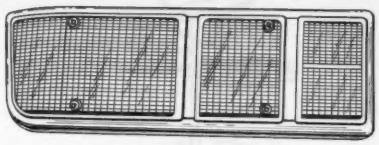


222,555
HOUSING FOR TABLE LAMP
Lodovico Magistretti, Via Conservatorio 20, Milan, Italy
Filed Aug. 12, 1970, Ser. No. 24,447
Term of patent 7 years
Int. Cl. D26—*05*
U.S. Cl. D48—20

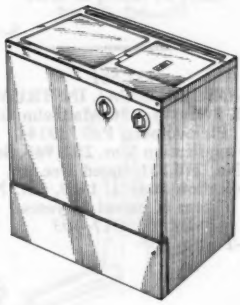
222,556
FLOODLIGHT OR THE LIKE
William R. Mattson, Gloucester, and Ruth G. Petersen, Medfield, Mass., assignors to Sylvania Electric Products
Filed Sept. 9, 1970, Ser. No. 24,904
Term of patent 14 years
Int. Cl. D26—*03*
U.S. Cl. D48—20



222,557
LENS FOR VEHICLE TAIL LAMP
Michel Tixier, Billancourt, France, assignor to Regie Nationale des Usines Renault, Billancourt, Hauts-de-Seine, France
Filed Aug. 3, 1970, Ser. No. 24,261
Term of patent 14 years
Int. Cl. D26—*06*
U.S. Cl. D48—32



222,558
LAUNDRY MACHINE
Thomas R. Smith, Newton, Iowa, assignor to The Maytag Company, Newton, Iowa
Filed Dec. 18, 1969, Ser. No. 20,564
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D49—1



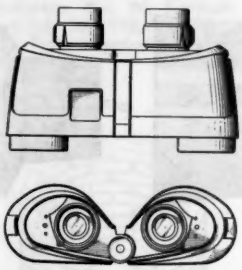
222,559
WASTE RECEPTACLE OR THE LIKE
Mary D. Nichols, 1251 Campbell Circle, and Beatrice D. Patrinely, 1551 Boulevard, both of Jacksonville, Fla. 32207
Filed May 28, 1970, Ser. No. 23,201
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D49—35

222,560
FISHING LURE
John C. Boucher, Jr., 9543 Weatherwood, Houston, Tex. 77055
Filed July 22, 1970, Ser. No. 24,072
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—28

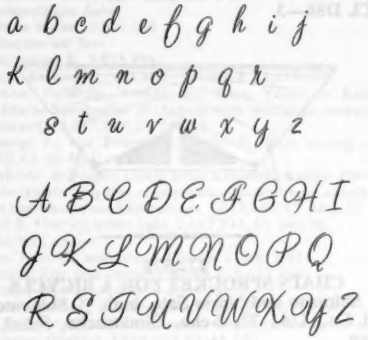
222,561
STRINGED MUSICAL INSTRUMENT
Walter J. Pelensky, 19C Manheim Gardens, Philadelphia, Pa. 19144
Original design application Mar. 25, 1968, Ser. No. 11,179, now Patent No. 216,331, dated Dec. 16, 1969. Divided and this application June 3, 1969, Ser. No. 17,483
Term of patent 14 years
Int. Cl. D17—*03*
U.S. Cl. D56—1

222,562
STRINGED MUSICAL INSTRUMENT
Walter J. Pelensky, 19C Manheim Gardens, Philadelphia, Pa. 19144
Original design application Mar. 28, 1968, Ser. No. 11,179, now Patent No. 216,331, dated Dec. 16, 1969. Divided and this application June 3, 1969, Ser. No. 17,503
Term of patent 14 years
Int. Cl. D17—*03*
U.S. Cl. D56—1

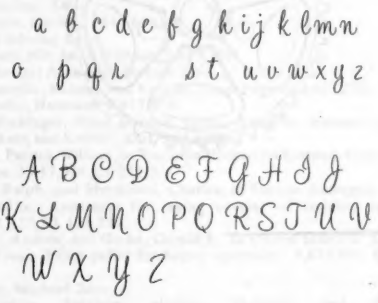
222,563
BINOCULAR
Paul R. Maguire, Los Angeles, Calif., assignor to David P. Bushnell, Altadena, Calif.
Filed Feb. 16, 1970, Ser. No. 21,442
Term of patent 14 years
Int. Cl. D16—*08*
U.S. Cl. D57—1



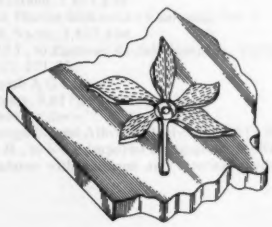
222,564
FONT OF TYPE
William Sandwick, Cleveland, Ohio, assignor to American Greetings Corporation, Cleveland, Ohio
Filed Feb. 2, 1970, Ser. No. 21,195
Term of patent 14 years
Int. Cl. D18—*04*
U.S. Cl. D64—12



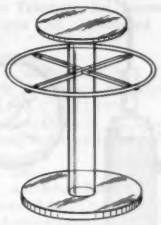
222,565
FONT OF TYPE
William Sandwick, Cleveland, Ohio, assignor to American Greetings Corporation, Cleveland, Ohio
Filed Feb. 2, 1970, Ser. No. 21,196
Term of patent 14 years
Int. Cl. D18—*04*
U.S. Cl. D64—12



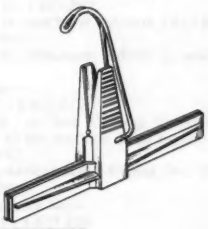
222,566
BASE FOR A PEN DESK SET OR SIMILAR ARTICLE
Harold A. Dunn, Franklin County, Ohio
(3237 McKinley Ave., Columbus, Ohio 43204)
Filed Feb. 18, 1970, Ser. No. 21,500
Term of patent 7 years
Int. Cl. D19—*02*
U.S. Cl. D74—5



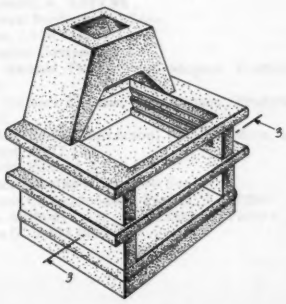
222,567
GARMENT DISPLAY FIXTURE
Maurice Cohen, 3580 NW. 52nd St., Miami, Fla. 33142
Filed Mar. 23, 1970, Ser. No. 22,004
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D80—8



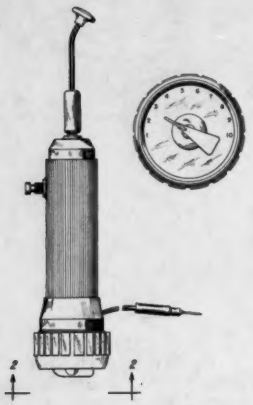
222,568
CLOTHES HANGER
Stewart S. Battles, Box 907, Galesburg, Ill. 61401, and Oscar N. Brown, Rock Island, Ill. (601 3rd Ave., Moline, Ill. 61265)
Filed Aug. 5, 1970, Ser. No. 24,325
Term of patent 14 years
Int. Cl. D6—*08*
U.S. Cl. D80—8



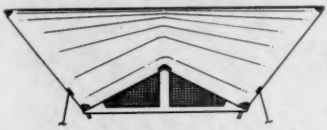
222,569
BARBECUE
Ralph A. Ford, Westtown, N.Y., assignor to Valley Cast Concrete, Inc., Westtown, N.Y.
Filed Aug. 12, 1970, Ser. No. 24,462
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D81—10



222,570
ELECTRICAL NERVE STIMULATOR
Blair A. Rowley and Ross D. Young, Columbia, Mo., assignors to Institute of Bioengineering Research Incorporated
Filed Feb. 12, 1970, Ser. No. 21,406
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D83—1



222,571
TENT
Charles R. Gretz, Jacksonville, Fla., assignor to Terraquatics, Inc.
Filed Jan. 2, 1970, Ser. No. 20,754
Term of patent 14 years
The portion of the term of the patent subsequent to Aug. 10, 1984, has been disclaimed
Int. Cl. D21—*05*
U.S. Cl. D88—3



222,572
CHAIN SPROCKET FOR A BICYCLE
Keizo Shimano and Norio Sato, both % Shimano Industrial Co., Ltd., 77, 3-cho, Oimatsucho, Sakai, Osaka, Japan
Filed Apr. 23, 1969, Ser. No. 16,866
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D90—17

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 2D DAY OF NOVEMBER, 1971

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

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Nelson, James E., 3,616,813.

AB Bonnierforetagen: *See—*
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Abbott Laboratories: *See—*
Massie, Adrian B., 3,616,898.
Mattoon, Richard W.; and Macy, Lowell R., 3,617,299.

Abe, Zenmon; Furuhata, Yoshio; and Kato, Yasuo, to Kabushiki Kaisha Hitachi Seisakusho. Modulator with reactance clement having nonlinearity. 3,617,943, Cl. 332-52.

Ablah, George J.; and Townsend, James B. Wire cutting article. 3,616,535, Cl. 30-40.1

Adachi, Takeshi, to Nippon Gakki Seizo Kabushiki Kaisha. Electronic musical instrument capable of generating musical tone signals simulating the sounds of a wind instrument. 3,617,604, Cl. 84-1.22

Adams, Bob R. Floating utility light. 3,617,733, Cl. 240-26.

Adams, Charles T.: *See—*
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Middleton, Roy; and Adams, Charles T.,3,617,789.

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Adickes, Cecil F., to Tonka Corporation. Combination toy vehicle and holding means therefor. 3,616,571, Cl. 46-202.

Adler, Harold. Aircraft radio navigation apparatus. 3,618,100, Cl. 343-107.

Adler, Karl; and Ducommun, Georges, to Biviator S.A. Automatic parking-time indicator. 3,616,644, Cl. 58-143.

Aebi, Hans: *See—*
Martin, Henry; Aebi, Hans; and Ebner, Ludwig,3,617,249.

AEG-Elotherm GmbH: *See—*
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Aeroject-General Corporation: *See—*
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Lampert, Bernard B., 3,617,400.

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Agfa-Gevaert Aktiengesellschaft: *See—*
Kampfer, Helmut; and Verhille, Karel Eugene, 3,617,270.
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Ohlschlager, Hans; Riester, Oskar; Kampfer, Helmut; Lohmer, Karl; and Kuffner, Karl, 3,617,296.

Agnew, Patrick William, to Precision Hydraulics Limited. Copy milling device. 3,617,024, Cl. 251-3.

Agthe, Ralph; and Merminod, Charles, to Societe Anonyme Conrad Zschokke. Apparatus for laying coating of resinous material. 3,617,423, Cl. 156-575.

Aguilar, Andres; and Gerke, Gerald E., to United States of America, Air Force. Pallet puller for heavy equipment. 3,616,952, Cl. 214-372.

Ahlgrim, Michael: *See—*
Kandler, Joachim; Mietens, Gerhard; and Ahlgrim, Michael,3,617,343.

Ahlstrom, A., Osakeyhtio: *See—*
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Ainslie, Dianne B.; and Crapsey, Arthur H., to Eastman Kodak Company. Cartridge. 3,617,013, Cl. 242-197.

Airtex Products: *See—*
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Akerman, Emanuel: *See—*
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Aktiebolaget Electrolux: *See—*
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Aktiebolaget Karlstads Mekaniska Werkstad: *See—*
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Aktiengesellschaft Brown, Boveri & Cie: *See—*
Brandt, Armand, 3,617,838.

Aktieselskabet Thunes Mekaniske Vaerksted: *See—*
Hundseid, Narve, 3,617,444.

Albert, Donald J., to Eastman Kodak Company. Vacuum paper feeder. 3,617,048, Cl. 271-26.

Albiswerk Zurich A.G.: *See—*
Landis, Peter, 3,617,692.

Albright, Melvin A.: *See—*
Hays, George E.; and Albright, Melvin A.,3,616,602.

Albright, Roy H., to I-T-E Imperial Corpoation. Multi-ring hollow high voltage insulator with external and internal sheds. 3,617,618, Cl. 174-209.

Alcaide, Harold David, to Continental Electronics Manufacturing Co. Voltage to current converter for driving a meter movement. 3,617,887, Cl. 324-120.

Alderfer, Sterling W., to Teledyne, Inc., mesne. Method for making reinforced ignition-tube of reinforced polyurethane foam. 3,617,593, Cl. 264-45.

Alfa-Laval AB: *See—*
Javorsky, Bronislav S.; and Gramer, Erik A., 3,616,610.

Alford, Andrew. Metallic structure with coupled network to reduce back scattering. 3,618,113, Cl. 343-885.

Alkire, John C.; and Nelson, Donn G., to Anaconda Wire and Cable Company. Printed circuit board connector clip. 3,617,980, Cl. 339-32.

All-Steel Equipment Inc.: *See—*
Rudolph, Nathan H.; and Boyd, Ronald G., 3,616,522.

Allen, James D., to Honeywell Inc. Circuit for charging the distributed capacitance of a plated wire memory. 3,617,775, Cl. 307-270.

Allen, Joseph C.: *See—*
Braden, William B., Jr.; and Allen, Joseph C.,3,616,854.

Allen, Joseph C., to Texaco Inc. Oil recovery process using dilute acid. 3,616,852, Cl. 166-271.

Allen, Milton F. Electronic detection and tracing means. 3,618,059, Cl. 340-224.

Allen, R. C., Business Machines Incorporated: *See—*
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Dummermuth, Ernst H., 3,617,715.
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Alter, Vladimir, to American Metal Climax, Inc. Ventilator structure. 3,616,743, Cl. 98-99.

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Brown, Melvin H.; and Wei, Maurice W., 3,617,345.
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Ohi, Reiichi; Amano, Hiroyuki; Iwano, Haruhiko; and Shirasu, Kazuo,3,617,283.

Amemiya, Kiyoshi; and Yamazaki, Kazuhiko, to Hitachi, Ltd. Tuning circuit having a neutralizing circuit. 3,617,915, Cl. 330-27.

American Air Filter Company, Inc.: *See—*
Everett, Wilhelm S.; and Glover, Robert C., 3,616,627.
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American Chain & Cable Company, Inc.: *See—*
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American Greetings Corporation: *See—*
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American Hoist & Derrick Company: *See—*
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Amiet, Bernard Paul Louis, to Societe des Accumulateurs Fixes et de Traction (Societe Anonyme). Production of metal powders, particularly for use in electrodes and production of electrodes from these products. 3,617,253, Cl. 75-0.5
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Patton, George Allen, 3,617,612.
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Vander Hooven, John; and Vander Hooven, David I. B., 3,617,564.
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Anderson, Harold V.: *See—*
Chang, N Ming; and Anderson, Harold V.,3,616,651.
Anderson, Larry H., to Litton Business Systems, Inc. Motor stall overcoming device in a power typewriter. 3,616,887, Cl. 197-17.
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Anderson, Victor C., to United States of America, Navy, mesne. Vertical obstacle profiling sonar. 3,618,007, Cl. 340-3.
Angelo, Jacob B.: *See—*
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Atakkaan, Namik O., 3,617,672.
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Arima, Kei; and Tamura, Gakuzo, to United States of America, Agriculture. Production of mevalonic acid by endomycopsis fibuliger. 3,617,447, Cl. 195-37.
Arimura, Ichiro, to Matsushita Electric Industrial Co., Ltd. Method and apparatus for transmitting or recording and reproducing line-sequential color television signals. 3,617,620, Cl. 178-5.2
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Arndt, William C., to Weil-McLain Company, Inc. Gas-boiler igniting system. 3,617,159, Cl. 431-6.
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Bond, Walter L.; Duguay, Michel A.; and Rentzepis, Peter M., to Bell Telephone Laboratories, Incorporated. Pumping arrangements for lasers operating at wave- lengths shorter than visible light. 3,617,939, Cl. 331-94.5

Bonesho, James A.; and Bollinger, John Gustave,, to Wisconsin Alumni Research Foundation. Phase angle measuring system for vibration dampers or the like. 3,617,884, Cl. 324-83.

Bongiovanni, Anthony S., to Esti-Mate, Inc. Marker-counter device. 3,617,708, Cl. 235-64.

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Bonyhard, Peter I.; Gianola, Umberto F.; and Perneski, Anthony J., to Bell Telephone Laboratories, Incorporated. Magnetic domain storage organization. 3,618,054, Cl. 340-174.

Booher, Robert Kenneth, to North American Rockwell Corporation. Field effect transistor logic gate with isolation device for reducing power dissipation. 3,617,767, Cl. 307-205.

Boone, Melvin H.; and Bush, Brian J., to American Hoist & Derrick Company. Vibratory roller. 3,616,730, Cl. 94-50.

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Boyd, Ronald G.: *See—*
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Boyle, William R., to Glacier Metal Company Limited, The. Pulse generator. 3,616,639, Cl. 58-28.

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Braden, William B., Jr.; and Allen, Joseph C., to Texaco Inc. Oil recovery process. 3,616,854, Cl. 166-274.

Brafford, Donald A., to Beloit Corporation. Roll composition. 3,617,445, Cl. 162-358.

Bragg, Stephen Lawrence, to Rolls-Royce Limited. Fluid flow machine. 3,617,147, Cl. 415-77.

Brailsford, Harrison D. Self-synchronizing direct current brushless motor. 3,617,841, Cl. 318-254.

Bramley, Robert K.; and Bourassa, Hugh A., to Hahn, Inc. Mower. 3,616,626, Cl. 56-7.

Brand, Zay C., to North American Rockwell Corporation. Gimbal zone transfer apparatus. 3,616,699, Cl. 74-5.2

Brandau, William E., to Bendix Corporation, The. Mission capability indicating system. 3,616,691, Cl. 73-178.

Brander, Richard, to Beltone Electronics Corporation. Variable attenuator wherein input signal is switched in response to movement of variable tap. 3,617,959, Cl. 333-81.

Brandt, Armand, to Aktiengesellschaft Brown, Boveri & Cie. Arrangement for stepless speed regulation of a motor fed with current from a converter. 3,617,838, Cl. 318-225.

Branson, Charles D.; and Wolfe, Denis G., to Robertshaw Controls Company. Fuel control system and parts therefor or the like. 3,617,972, Cl. 337-323.

Braue, Charles E., to Data Appliance Corporation. Pressure operated layered electrical switch and switch array. 3,617,666, Cl. 200-86.

Braun, Francois , Marie Joseph, to Societe Anonyme Belge d'Exploitstion de la Navigation aerienne (SABENA). Cushion. 3,616,471, Cl. 5-348.

Braun-Boveri & Cie Aktiengesellschaft: *See—*
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Brean, John W.; and Stiedle, Paul P., to Baldwin, D. H., Company. Optical encoder. 3,618,074, Cl. 340-347.

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Bryson, Millard C.; and Murphy, James R., to Gulf Research & Development Company. Fluid catalytic cracking process with a segregated feed charged to the reactor. 3,617,497, Cl. 208-80.
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Csicsery, Sigmund M., to Chevron Research Company. Hydrocracking catalyst comprising a layered clay- type crystalline aluminosilicate component, a group VIII component and gold, process using said catalyst. 3,617,489, Cl. 208-60.

Csicsery, Sigmund M., to Chevron Research Company. Hydrocracking catalyst comprising a layered clay- type crystalline aluminosilicate component a group VIII component, and a chromium or tungsten component, and process using said catalyst. 3,617,490, Cl. 208-60.

Csicsery, Sigmund M., to Chevron Research Company. Hydrocracking catalyst comprising a layered clay- type crystalline aluminosilicate component, a group VIII component and a thorium or uranium component and process using said catalyst. 3,617,491, Cl. 208-60.

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Fink, Charles; Burnham, Fred E.; and Marks, Maury I., to Litton Systems, Inc. Digital frequency detecting system. 3,617,900, Cl. 324-82.

Fink, James A.: *See—*
Dunlap, Charles K., Jr.; and Fink, James A.,3,616,819.

Finlay, Walter L.: *See—*
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Fischer & Porter Co.: *See—*
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Fischer, Hans, to Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft. Piston cooling for internal combustion engine. 3,616,729, Cl. 92-176.

Fischer, Joseph; and Haddock, Thomas E., to National Distillers and Chemical Corporation. Adhesive and method for bonding cross-linked polyolefins and other polymeric material. 3,617,419, Cl. 156-332.

Fischer, Russell C., to GTE Automatic Electric Laboratories Incorporated. Disabling circuit of a transmission line amplifier. 3,617,655, Cl. 179-170.4

Fisher, Charles Donald, to American Can Company. Composite coated with acetylene-oxygen polymers. 3,617,365, Cl. 117-132.

Fisher, Royal P. Artificial tree with an electrical illuminating system. 3,617,732, Cl. 240-10.

Fisons Limited: *See—*
Hartley, Gilbert Spencer, 3,616,973.

Flack, Herbert P.; Katz, Herbert M.; and Ashby, George E., to Grace, W. R., & Co. Process for forming uniform microspheres. 3,617,584, Cl. 264-0.5

Flatt, Joseph, to Tech Development, Inc. Particle separator, especially for use in connection with jet engines. 3,616,616, Cl. 55-306.

Fleckenstein, Andrew J. Softener valve. 3,616,820, Cl. 137-624.13

Fleetwood, Michael John: *See—*
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Fletcher, William J.: *See—*
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Fleury, Jacaues, to Societe Anonyme Automobiles Citroen. Adjustable lighting equipment for road vehicle. 3,617,731, Cl. 240-8.25

Flex-O-Lite, Division: *See—*
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Florens, Raymond Leopold: *See—*
De Munck, Joseph Louis; and Florens, Raymond Leopold,3,617,284.

Flournoy, Philip A., to Du Pont de Nemours, E. I., and Company. Apparatus and method for perforating sheet material. 3,617,702, Cl. 219-384.

Flughafen Frankfurt am Main Aktiegesellschaft Fulghafen: *See—*
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FMC Corporation: *See—*
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Joseph, Robert T.; Trechock, Jack; Saller, Erik; and Work, Josiah, 3,617,256.

Foch, Pierre, to Charbonnages de France. Heat treatment of sludges. 3,617,037, Cl. 263-21.

Foelkel, Wilhelm P.; and Seidel, Georg F., to Wurlitzer Company, The. Automatic apparatus for selectively playing a plurality of tape cassettes. 3,617,066, Cl. 274-4.

Fogelstrom, Allen A., to SSP Industries. Tack welding torch. 3,617,688, Cl. 219-130.

Foldvari, Ernie; and Walstad, Dennis C., to Furnas Electric Company. Impedance switching timer. 3,617,815, Cl. 317-142.

Follansbee Steel Corporation: *See—*
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Fontaine, Paul Isidore; Fleetwood, Michael John; and Lewis, Harry, to International Nickel Company, Inc., The. Corrosion resistant nickel-chromium base alloy. 3,617,263, Cl. 75-171.

Foral, Adolph J., Jr., to Black, Sivalls & Bryson, Inc. Method and system for reconcentrating liquid absorbent. 3,616,598, Cl. 55-32.

Ford, David E., Jr.; and Waltz, Richard W., to Allen-Bradley Company. Circuit for summing electrically isolated signals. 3,617,861, Cl. 323-33.

Ford, Francis P., to Olin Mathieson Chemical Corporation. Method of working aluminum-magnesium alloys to confer satisfactory stress corrosion properties. 3,617,395, Cl. 148-11.5

Ford, James A.; Bell, David E.; and Clark, Paul P., to Kirsch Company. Swivel supported drapery hanger for use with traverse rods having a rearwardly opening slot. 3,616,486, Cl. 16-87.2

Ford, Lionel Houston: *See—*
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Ford Motor Company: *See—*
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Valukonis, Jonas, 3,617,078.

Foreman, Dave O. Barbecuing apparatus. 3,616,748, Cl. 99-450.

Forster, Friedrich M. O. Magnetic leakage field flow detector utilizing two ring core sensors. 3,617,874, Cl. 324-37.

Foslien, Floyd L., to Minnesota Mining and Manufacturing Company. Microfiche handler with free floating and vernier-type movement of support frame. 3,616,737, Cl. 95-37.

Foster, Jimmie L., to Collins Radio Company. Mach computation from altitude and calibrated airspeed. 3,617,721, Cl. 235-150.2

Fowler, William L., to Texas Instruments, Incorporated. Method of fabricating semiconductor power devices within high resistivity isolation rings. 3,617,399, Cl. 148-175.

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Foxman, Herbert: *See—*
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Frame, William L.; and Renfrow, Robert D. Stackable storage racks. 3,616,937, Cl. 211-24.

Franssen, Nico Valentinus, to U.S. Philips Corporation. Method of producing tones of an equally tempered scale. 3,617,901, Cl. 328-17.

Franz, Karl; and Kochmann, Gerhard, to Siemens Aktiengesellschaft. Image intensifier including polyimide support. 3,617,791, Cl. 313-94.

Freedman, Nathan, to Raytheon Company. Noise signal detector. 3,617,998, Cl. 340-5.

Freeman, Jerry H., to Power Pak, Inc. Electric cord reel. 3,617,659, Cl. 191-12.2

Freerks, Marshall C.: *See—*
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Frenkel, Marvin A. Method and apparatus for selectively preventing the explosion of explodable projectiles. 3,616,754, Cl. 102-70.2

Frey, Cleon F., to International Flasher Corporation. Low energy input buzzer. 3,618,080, Cl. 340-396.

Friday, Robert E.; Kobe, Clyde M.; and Locker, James W ., to Honeywell Inc. Synchronization and attitude command nulling apparatus. 3,617,848, Cl. 318-584.

Fried. Krupp Gesellschaft mit beschrankter Haftung: *See—*
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Ziehm, Gunter Hans; Triebold, Karl-Friedrich; and Drischel, Siegfried Franz Heinrich, 3,618,013.

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Friedman, David: *See—*
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Friestad, Isak Andreas; and Skauli, Oyvind, to Norsk Hydro-Elektrisk Kvaelstofaktieselskab. Process by spraying melts or suspensions with low water comprising fertilizers containing the plant nutrients nitrogen and phosphorus. 3,617,235, Cl. 71-1.

Frigeo-Werk Belte & Co.: *See—*
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Fritsch, Charles A.; and Prager, David J., to Bell Telephone Laboratories, Incorporated. Thermal lens having a fluid-filled cylindrical aperture through the center of a square-shaped block. 3,617,108, Cl. 350-96.

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Frush, Donald Irwin; and Rizzi, Albert Daniel, to International Business Machines Corporation. Optical image frame coordinate data determining system. 3,617,134, Cl. 356-162.

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Fujimoto, Sakae, to Kabushiki Kaisha Ricoh. Film counter device for use with a camera using non-perforated film. 3,616,995, Cl. 235-91.

Fujisawa Pharmaceutical Co., Ltd.: *See—*
Ishida, Seiichi; Kamuro, Yasuo; Takano, Tadayoshi; and Iwata, Takashi, 3,617,245.

Fujita, Hyota; and Irie, Kouichi, to Mitsubishi Denki Kabushiki Kaisha. Automatic frequency tuning system. 3,617,924, Cl. 331-70.

Fujita, Susumu, to Fuji Photo Film Co., Ltd. Camera with a retractable lens barrel. 3,616,738, Cl. 95-39.

Fujita, Teizo. Electromagnetic relay. 3,618,136, Cl. 335-202.

Fukuhara, Mototada: *See—*
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Fulghafen Frankfurt am Main Aktiengesellschaft Fulghafen: *See—*
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Fuller, Clyde R., to Texas Instruments, Incorporated. Corrosion-resistent multimetal lead contact for semiconductor devices. 3,617,818, Cl. 317-234.

Fulmer, Keith H.: *See—*
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Furnas Electric Company: *See—*
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Furst, Stefan, to Reiners, Walter, Peter-Nonnenmuhlen-Allee. Warp knitting machine. 3,616,656, Cl. 66-84.

Furst, Stefan, to Reiners, Walter, Peter-Nonnenmuhlen-Allee. Warp knitting machine. 3,616,657, Cl. 66-84.

Furuhata, Yoshio: *See—*
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Fuxelius, Kaj O.H., to Research AB. Process and a product for the purification of polluted water from heavy metal ions present therein. 3,617,563, Cl. 210-38.

GAF Corporation: *See—*
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Gantz, George M.; Mackey, E Scudder; and Mayhew, Raymond L., 3,617,292.
Schenderling, Dick W.; and Bijl, Dingeman, 3,617,412.
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Gale, Donald J., to Deering Milliken Research Corporation. Two step cellulosic fabric modification under different reaction conditions. 3,617,196, Cl. 8-116.3

Gantz, George M.; Mackey, E Scudder; and Mayhew, Raymond L., to GAF Corporation. Coating compositions comprising a celloid and a polyoxyalkylene ether of a monohydric alcohol containing more than two alkyl side chains. 3,617,292, Cl. 96-114.5

Garcia, Juan A., to Esso Production Research Company. Safety fill flow control well apparatus. 3,616,851, Cl. 166-224.

Garde, Lawrence, to Control Data Corporation. Voltage controlled oscillator. 3,618,131, Cl. 331-113.

Gardner-Denver Company: *See—*
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Stillwagon, George B., Jr., 3,616,827.

Garfinkel, Julius. Dry incontinent garment. 3,616,798, Cl. 128-295.

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Garland, Theodore F., to Garland Manufacturing Company. Floatation pump device. 3,617,146, Cl. 415-7.

Garrison, John B., to United States of America, Navy. Radar. 3,618,090, Cl. 343-16.

Garuts, Valdis E., to Tektronix, Inc. High efficiency regulated oscillator circuit having a substantially sinuosidal waveform. 3,618,130, Cl. 331-109.

Garzon, Ruben D., to I-T-E Imperial Corporation. Current zero anticipating circuit for asymmetric waves. 3,617,906, Cl. 328-150.

Garzon, Ruben D., to I-T-E Imperial Corporation. Current zero anticipating circuit. 3,617,907, Cl. 328-150.

Gates, Richard L., to Koppers Company, Inc. Method and apparatus for piercing a pole to accommodate hardware molding fasteners. 3,617,140, Cl. 408-1.

Gebhard, Harold L.: *See—*
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Gebruder Buhler AG: *See—*
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Gelo, Stephen, Jr.: *See—*
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Grove, Robert J.; and Reeder, Merrill M., 3,618,112.
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Miller, Tom B.; and Noponen, Harold W., 3,616,960.
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Wagle, Joseph A., 3,617,150.
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General Steel Industries, Inc.: *See—*
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Gentili, Renato, to Buss AG. Apparatus for the continuous recovery of acids from inert organic media. 3,616,611, Cl. 55-165.

Gentleman, William M., to Bell Telephone Laboratories, Incorporated. Fast fourier transform using hierarchical store. 3,617,720, Cl. 235-156.

Gerbic, Charles C.; and Molloy, Terrence V., to Grove Valve and Regulator Company. Ball valve with retractable seat rings. 3,617,025, Cl. 251-172.

Geretschlaeger, George J., to Federal Cartridge Corporation. Gun cartridge holder. 3,616,976, Cl. 224-21.

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Germann, Reimar; and Haase, Siegbert, to List, Hans. Circuitry for the production of a speed- proportional deflecting voltage. 3,617,869, Cl. 324-15.

Gershman, Melvin Y.: *See—*
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Gerst, Carl W.; and Sly, Thomas L., to Anaren Microwave, Inc. Microwave signal amplifier with feedback. 3,618,126, Cl. 330-53.

Gerstine, Milton I.; and Burkam, John E., to Boeing Company, The. Vibration control system. 3,617,020, Cl. 244-17.27

Gerstmeier, George A., to Beckman Instruments, Inc. Rotor and contact assembly for variable resistance device. 3,617,978, Cl. 338-174.

Gesellschaft zur Forderung der Forschung an der Eidg. Techn. Hochschule: *See—*
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Laridon, Urbain Leopold; Delzenne, Gerard Albert; and Peeters, Hugh Karel, 3,617,280.
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Geyer, Jerome; and Hu, Shih-En, to Esso Research and Engineering Company. Lubricating oil treatment system. 3,617,580, Cl. 210-60.

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Gibbs, Dale S.; and Wessling, Ritchie A., to Dow Chemical Company, The. Process for preparing inherently colloidally stable interpolymers in aqueous dispersion and products coated therewith. 3,617,368, Cl. 117-161.

Gibson, Carman H. Micro-inch measuring instrumentation system. 3,617,133, Cl. 356-159.

Gibson, Myron R., to Caterpillar Tractor Company. Air inlet filter assembly. 3,617,149, Cl. 415-121.

Gifford-Hill Pipe Company: *See—*
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Gilard, Pierre; and Galanti, Maurice, to Institut National du Verre A.S.B.L. Decorative surface relief pattern. 3,617,336, Cl. 117-37.

Gilder, Peter John, to Wiggins Teape Research & Development Limited. Controling the wash liquid temperature while preparing parchmentised webs. 3,617,200, Cl. 8-118.

Giles, Maurice Eric; and Waller, John George, to National Research Development Corporation. Electrolytic deposition. 3,617,449, Cl. 204-3.

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Gillette Company, The: *See—*
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Giltrow, John, to Reeve, H., Angel & Company Limited. Preparative separation of fluid samples. 3,617,557, Cl. 210-31.

Gingell, Michael John, to International Standard Electric Corporation. Symmetrical polyphase networks utilizing constant reactances. 3,618,133, Cl. 333-24.

Ginsburgh, Irwin; and Will, Robert G., to Standard Oil Company. Method and apparatus for removing oil and debris from water. 3,617,555, Cl. 210-30.

Girauldon, Jean-Claude, to Societe Anonyme D.b.A. Antirattle system for disc brake. 3,616,878, Cl. 188-73.5

Girling Limited: *See—*
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Glacier Metal Company Limited, The: *See—*
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Glavis, Frank J.: *See—*
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Gleeson, Robert Leonard, to Lucas, Joseph, (Industries) Limited. Plunger operated switch with offset adjustment means. 3,617,671, Cl. 200-159.

Glenn, William E., Jr.; and Gorman, Frank B. Sonography system. 3,617,994, Cl. 340-3.

Glenn, William E., Jr.: *See—*
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Globe-Union, Inc.: *See—*
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Glover, Robert C.: *See—*
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Goff, Myron F. Method for spray-coating a roof with a composition containing liquid asphalt and fluffed asbestos fiber. 3,617,329, Cl. 117-27.

Goldfarb, Adolph Eddy; and Soriano, Rene, said Soriano assor. to said Goldfarb. Removable stick game. 3,617,057, Cl. 273-1.

Goldfarb, Adolph Eddy; and Soriano, Rene, said Soriano assor. to said Goldfarb. Play device. 3,617,058, Cl. 273-1.

Goldfarb, Adolph E.; and Soriano, Rene, said Soriano assor. to said Goldfarb. Manipulative device for competitive play. 3,617,061, Cl. 273-110.

Goldsberry, Paul E.; and Simpson, Jack Ward, to International Business Machines Corporation. Automatic data composing, editing and formatting system. 3,618,032, Cl. 340-172.5

Goldsmith, John V.: *See—*
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Goldthwait, Richard G.: *See—*
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Golis, Matthew J.; Mc Master, Robert C.; and Cooper, Gary L., to Ohio State University, The. Ultrasonic nondestructive thickness gauge. 3,616,682, Cl. 73-67.7

Gomi, Shimpei; and Hosoi, Takuji, to Kureha Kagaku Kogyo Kabushiki Kaisha. Process for producing a pitch and tarry substance. 3,617,477, Cl. 208-40.

Goncharoff, Nikolai; and Jabbar, Kamil Y., to Motorola, Inc. Tuning control for multiple electronically tuned circuits. 3,617,899, Cl. 325-452.

Goodman, Harold, to Goodtone Manufacturing Co. Toy airplane. 3,616,567, Cl. 46-78.

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Goodwin, Robert C., to Anchor Hocking Corporation. Self-acting connector for applying coolant air to glass molds. 3,617,232, Cl. 65-267.

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Goorissen, Jan; and Van Der Werf, Pieter, to U.S. Philips Corporation. Method of vacuum-tight closure of thin beryllium windows and X-ray tube provided with such a window. 3,617,788, Cl. 313-59.

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Koegel, Robert J.: *See—*
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Koehler, Dale R.: *See—*
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Koennecke, Wolfgang; and Stricker, Reinhold, to Fulghafen Frankfurt am Main Aktiengesellschaft Fulghafen. Accumulation section for a conveyor. 3,616,894, Cl. 198-127.

Koennecke, Wolfgang; and Strickler, Reinhold, to Flughafen Frankfurt am Main Aktiegesellschaft Fulghafen. Rail switches for pallet conveyor systems. 3,616,892, Cl. 198-78.

Kohl, Otto A. Animal feed. 3,617,298, Cl. 99-2.

Kohler, Oskar; and Rosler, Wulff, to Gewerkschaft Eisenhutte Westfalia. Scraper chain conveyors. 3,617,092, Cl. 299-43.

Koizumi, Yutaka, to Kabushiki Kaisha Ricoh. Developer replenishing means for an electrostato- graphic apparatus. 3,616,969, Cl. 222-162.

Kok, Jurgen: *See—*
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Kokesh, Frank P.: *See—*
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Kolb, Erich, to Bosch, Robert, G.m.b.H. Windshield wiper drive. 3,616,702, Cl. 74-50.

Kolene Corporation: *See—*
Shoemaker, Robert H.; and Faler, John A., 3,617,455.

Komarek-Greaves and Company: *See—*
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Komarov, Vladil Afanasievich. Shell for the immobilization of animals. 3,616,758, Cl. 102-92.

Komori, Tooru, to Kabushiki Kaisha Suwa Seikosha. Date and day correcting device for a calendar timepiece. 3,616,641, Cl. 58-58.

Konishiroku Photo Industry Co., Ltd.: *See—*
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Koppelmann, Eldo K.; and Holloway, William S., to Madison Industries, Inc. Adjustable boring bar. 3,617,144, Cl. 408-187.

Koppensteiner, James V.; and Bakalik, Joseph J., to GTE Automatic Electric Laboratories, Incorporated. Tool for extracting printed circuit cards from card files. 3,617,083, Cl. 294-15.

Koppers Company, Inc.: *See—*
Gates, Richard L., 3,617,140.
Newhall, Henry S.; Thomas, Walter B.; and Gouye, Emmanuel V., 3,616,843.
Reinfeld, Kurt; and Assar, Dilip N., 3,617,040.
Reinfeld, Kurt; and Silverblatt, Leo, 3,617,041.
Tucker, Linwood G., 3,616,947.
Vietorisz, Joseph A., 3,616,812.

Korom, Arpad, to Gesellschaft zur Forderung der Forschung an der Eidg. Techn. Hochschule. Electronic circuit arrangement with at least one integrated electronic circuit utilizing constant current sources in connection with galvanic coupling between transistor stages coupled with each other in lieu of high ohmic resistors. 3,617,778, Cl. 307-303.

Kosicki, Witold W.; and Hollingsworth, Charles M., to Horseman Dolls Inc. Blinking eye doll. 3,616,572, Cl. 46-235.

Kossoff, Joseph: *See—*
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Kostelecky, Premysl; Hlavaty, Vladislav; Havlas, Jiri; and Rydlo, Jaromir, to Elitex, Zavody textilniho strojirenstvi. Device for the automatic fastening of supply yarn tubes of various diameters and for their changing in textile machines. 3,617,011, Cl. 242-130.

Kostylev, Alexandr Dmitrievich: *See—*
Sudnishnikov, Boris Vasilievich; Kostylev, Alexandr Dmitrievich; Gurkov, Konstantin Stepanovich; Tupitsyn, Konstantin Konstantinovich; Klimashko, Vladimir Vasilievich; Chepurnoi, Nikolai Prokhorovich; Terin, Vladimir Maximovich; Plavskikh, Vladimir Dmitrievich; Nazarov, Nikolai Grigorievich; and Rozhkov, Leonid Georgievich,3,616,865.

Kowalski, Xavier, to Monsanto Company. Wool stabilization process. 3,617,202, Cl. 8-127.6

Kowalski, Xavier, to Monsanto Company. Processes for scouring textiles. 3,617,206, Cl. 8-137.

Koyama, Toshiharu: *See—*
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Kraftco Corporation: *See—*
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Krakinowski, Morris, to International Business Machines Corporation. Keyboard actuating mechanism for diaphragm electric switch contact array. 3,617,660, Cl. 200-1.

Kramer, David E., to Woodhead, Daniel, Company. Heavy duty electrical plug. 3,617,981, Cl. 339-63.

Kramer, Dieter, to Zundapp-Werke Gesellschaft mit beschrankter Haftung. Suspension arrangement for two wheeled motor vehicle. 3,616,870, Cl. 180-32.

Kratzer, Adolf: *See—*
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Krause, George D., to American Air Filter Company, Inc. Collecting electrode plate assembly. 3,616,605, Cl. 55-130.

Krause, Gerhard, to Fernseh GmbH. Arrangement for controlling the recording of signals on magnetic storage devices. 3,617,652, Cl. 179-100.2

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Kress, Rene F.: *See—*
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Kristek, Ladislav; Svizela, Antonin; and Hampl, Ivo, to Prerovske strojirony, narodni podnik Prerov. Arrangement for classifying of liquid suspensions and of solid materials. 3,616,905, Cl. 209-310.

Kristiansen, Henry, to Interelectric Sachseln A.G. Current-collecting device for small commutating machines. 3,617,785, Cl. 310-236.

Kroehs, Alfred R., to Alpha Metals, Inc. Preform loader. 3,616,510, Cl. 29-203.

Kromrey, Robert V., to Aerojet-General Corporation. Honeycomb structures. 3,617,416, Cl. 156-173.

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Krueger, Fred G. Electronic musical tone generator employing pitch compensation. 3,617,601, Cl. 84-1.01

Kruer, Clifford W.: *See—*
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Krull, Irwin H.; and Mask, Charles A., to Beckman Instruments, Inc. Electrode assembly. 3,617,460, Cl. 204-195.

Krzyzanowski, Robert A., to Milprint, Inc. Carton with reclosable corner portion. 3,616,987, Cl. 229-17.

Kuchek, Henry A., to Dow Chemical Company, The. Method of coating magnesium and magnesium alloy articles. 3,617,350, Cl. 117-71.

Kudelski, Stefan. Automatic sensitivity regulating device. 3,617,777, Cl. 307-293.

Kuehne, Heinz; Dietze, Manfred; and Hauer, Franz, to Vickers-Zimmer Aktiengesellschaft Planung und Bau von Industrieanlagen. Polycondensation apparatus. 3,617,225, Cl. 23-285.

Kuether, Irwin C., to Traylor, Harshman, Palo and Cowan, mesne. Grounding connection for outlet box. 3,617,611, Cl. 174-51.

Kuffner, Karl: *See—*
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Kurata, Fred; and Swift, George W., to Kansas University Endowment Association, The. Gas purification process. 3,616,600, Cl. 55-48.

Kuratomi, Tatsuo. Process for the production of a silicon-coated diamond power. 3,617,347, Cl. 117-69.

Kuratsui, Takatoshi: *See—*
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Kurauchi, Noritaka; and Yoshida, Kenichi, to Sumitomo Electric Industries, Ltd. Induction radio system for vehicles. 3,617,890, Cl. 325-51.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See—*
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Kurosaki, Hideaki: *See—*
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Kurtzig, Arjeh J.; Le Craw, Roy Conway; and Wolfe, Raymond, to Bell Telephone Laboratories, Incorporated. Iron borate ($FeBo_3$) devices. 3,617,942, Cl. 332-7.51

Kutik, Louis F., to Precision Valve Corporation. Dispenser and metering valve therefor. 3,616,971, Cl. 222-249.

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Kyowa Hakko Kogyo Kabushiki Kaisha: *See—*
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Laakaniemi, Richard N.; and Schmitz, Norbert T., to Johnson Service Company. Fluidic condition sensing apparatus. 3,616,809, Cl. 137-81.5

Lafortune, Gerard Alain; and Leonard, Rene Marcel, to Sud-Aviation Societe Nationale de Constructions Aeronautiques. Power transmitting mechanisms, and applications thereof, notably to helicopters. 3,617,017, Cl. 244-17.11

Lafuente, Jose Amestoy; and Melero, Juan Antonio Leon. Puncture proof or under flatable tire. 3,616,831, Cl. 152-342.

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Laing, Randolph Neil. Method for casting large monolithic concrete structures. 3,616,649, Cl. 61-35.

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Lake Ontario Steel Company Limited: *See—*
Mulcahy, Joseph Aloysius, 3,617,595.

Lake, William H., to General Electric Company. Highly loaded fluorescent lamp particularly for D.C. operation. 3,617,792, Cl. 313-109.

La Martina, Anthony C., Jr.; and Malmborg, Floyd L., to American District Telegraph Company. Signal recording unit. 3,618,116, Cl. 346-59.

La Masters, George D., to Borg-Warner Corporation. Vapor control valve. 3,616,783, Cl. 123-136.

Lambertz, Hans-Reinhard: *See—*
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Lamfers, Benard: *See—*
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Lamort, Pierre, to Etablissements E. & M. Lamort Fils. Refining apparatus, chiefly for screening paper pulp. 3,617,008, Cl. 241-88.

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McAleenan, Kenneth; Pendergrast, John B., Jr.; La Morte, Howard W.; Pitt, Stanley; and Woods, William D.,3,616,938.

Lampert, Bernard B., to Aerojet-General Corporation. Nitrocellulose-based solid rocket propellant containing a carbamate plasticizer. 3,617,400, Cl. 149-2.

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Landsman, Irving; and Landsman, Emanuel,3,617,073.

Landsman, Irving; and Landsman, Emanuel. Automobile safety system. 3,617,073, Cl. 280-150.

Lang, Robert E.: *See—*
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Langman, Cyril A. J., to Dow Chemical Company, The. Dip coating process for preparing cellulose ether capsule shells. 3,617,588, Cl. 264-25.

Lapeyre, James M., to Laitram International, Inc. Archimedean screw type cooker conveyor. 3,616,747, Cl. 99-405.

Laridon, Urbain Leopold; and Delzenne, Gerard Albert, to Gevaert-Agfa N.V. Photopolymerisation of ethylenically unsaturated organic compounds employing an oxido-oxiazole photo- polymerizable coated element and method of using. 3,617,279, Cl. 96-35.1

Laridon, Urbain Leopold; Delzenne, Gerard Albert; and Peeters, Hugh Karel, to Gevaert-Agfa N.V. Photopolymerisation of ethylenically unsaturated organic compounds. 3,617,280, Cl. 96-35.1

Larkin, Sam. Electrode-moving and pressure-applying mechanism of welding apparatus in automatic machinery as for making wire mesh or the like. 3,617,678, Cl. 219-56.

Larson, Robert A., to Boston Cutting Die Company. Cutting die system. 3,616,720, Cl. 83-691.

Larson, Walter F. Power driven road sweeper with laterally and angularly adjustable brush. 3,616,477, Cl. 15-82.

Laser Link Corporation: *See—*
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Lash, Joseph F., to General Motors Corporation. Engine stopping control for an air motored engine baancing system. 3,616,686, Cl. 73-116.

Laskowski, Edward L., to General Electric Company. Delay line circuit for sequentially flashing photoflash lamps. 3,617,763, Cl. 307-41.

Lassen, Flemming; and Lassen, Per. Arrangement for the illumination of objects placed underneath or on shelves. 3,617,729, Cl. 240-2.

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Laukhuff, Otto, to Laukhuff, August. Wind generator for musical instruments, in particular pipe organs, and a sound damper therefor. 3,616,721, Cl. 84-355.

Laurenty, Francois, 1/2 to C.O.C.E.I.S.A. Evaporators having hollow, platelike, vertical heat transfer elements and overhead nozzles. 3,616,835, Cl. 159-13.

Lavedan, Louis J., Jr., to Sperry Rand Corporation. Waveguide partially formed of a flexible member for obtaining uniform minimal pressure contact with a load therein. 3,617,960, Cl. 333-95.

Laverty, Richard C., to MSL Industries, Inc. Stud supporting tool. 3,616,514, Cl. 29-283.

Lawes, Bernard Charles; and Mathre, Owen Bertwell, to Du Pont de Nemours, E. I., and Company. Process for detoxifying cyanide waste waters. 3,617,582, Cl. 210-63.

Lawson, John B.; and Dangel, Stephen C., to Robison Rayon Company, Inc. Yarn package pressure controller for yarn winding apparatus. 3,617,009, Cl. 242-18.

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Leach, James M., to Pfizer, Chas., & Co., Inc. Dyeing-assistants for synthetic fibers. 3,616,473, Cl. 8-172.

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Le Blanc, John R., to Alton Box Board Company, and Monsanto Company. Corrugated fiberboard. 3,617,427, Cl. 161-133.

Le Blanc, John R., to Alton Box Board Company, and Monsanto Company. Corrugated fiberboard. 3,617,429, Cl. 161-133.

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Lee, Joseph K. Automobile switch control and alarm system. 3,618,009, Cl. 340-64.

Lee, Sung Ki, to Hooker Chemical Corporation. Metalizing substrates. 3,617,320, Cl. 106-162.

Lee, Wing-Kai: *See—*
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Leeder, Harry A., Jr., to Dietz, R. E., Company. Compensated pilot indicator circuit for vehicle turn signal systems. 3,618,011, Cl. 340-80.

Lefebvre, Gaston Marie: *See—*
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Woods, William G.; Hunter, Don L.; Stone, James D.; and Le Fevre, Cecil W.,3,617,250.

Leger, Marc Jean Pierre; Le Rouge, Claude Paul Henri; and De Jean, Jacques Henri, to International Standard Electric Corporation. Electronic multiselector. 3,618,024, Cl. 340-166.

Leghorn, George R. Continuous centrifugal casting of tube using liquid mold. 3,616,842, Cl. 164-84.

Legood, Peter; and Billson, Reginald Richard, to Cotton, William, Limited. Straight bar knitting machines. 3,616,659, Cl. 66-88.

Lehmann, Willi, to Westinghouse Electric Corporation. Method for stabilizing alkaline-earth metal sulfide phosphors. 3,617,332, Cl. 117-33.5

Lehnhoff, Richard N., to General Motors Corporation. Alternator under-frequency detecting circuit. 3,617,856, Cl. 322-24.

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Graffelman, Hendrik Albertus, 3,617,308.

Levine, David J., to General Electric Company. High temperature metallic diffusion coating and method. 3,617,360, Cl. 117-107.2

Levy, Kenneth; Mulvaney, James M.; and Friedman, David, to Computervision Corporation. Method and apparatus for article positioning utilizing an incremental article drive system and null transit counter. 3,617,751, Cl. 250-201.

Levy, Ralph; and Rhodes, John David, to Microwave Development Laboratories, Inc. Semi-lumped comb line filter. 3,617,954, Cl. 333-73.

Lewis, Charles Edward, to American Cyanamid Company. Aminoarylazopyridine oxide dyeing nickel modified polypropylene fibers and fibers so dyed. 3,617,179, Cl. 8-42.

Lewis, Edward F., to Du Pont de Nemours, E. I., and Company. Foamed polylactam buoyant belt. 3,616,475, Cl. 9-340.

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Lewis, Philip W.: *See—*
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Lewis, William R.; Mason, Ralph B.; and Hamner, Glen P., to Esso Research and Engineering Company. Hydrocrackfining of hydrocarbon fractions over mixed metal catalysts. 3,617,486, Cl. 208-59.

Lherbier, Louis W.; and Rizzo, Frank J., to Cyclops Corporation. Wrought nickel base superalloys. 3,617,261, Cl. 75-171.

Li, Norman N.; Cahn, Robert P.; and Shrier, Adam L., to Esso Research and Engineering Company. Removal of organic compounds by liquid membrane. 3,617,546, Cl. 210-22.

Libbrecht, Pierre, to SA Teinturerie des Francs. Installation for dyeing sleeves. 3,616,664, Cl. 68-189.

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Lichtenstein, Eric S. Tubular dialysis filtration apparatus. 3,616,926, Cl. 210-331.

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Lieberman, George: *See—*
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Liebl, Helmut, to Institut fur Plasmaphysik G.m.b.H. Ion lens to provide a focussed ion, or ion and electron beam at a target, particularly for ion microprobe apparatus. 3,617,739, Cl. 250-49.5

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Lindblad, Cyril Martin. Retractable boat launching wheel. 3,616,474, Cl. 9-1.

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Lindgren, Nils Kauri, to Aktiebolaget Electrolux. Structure for mounting electric motors. 3,617,784, Cl. 310-91.

Lindin, Gregory E., to Polaroid Corporation. Printing of lenticular films. 3,617,281, Cl. 96-40.

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List, Ferdinand; Strobele, Rudolf; and Strauss, Gunther, to Chemische Werke Huls Aktiengesellschaft. Apparatus for the continuous preparation of esters. 3,617,226, Cl. 23-288.
List, Hans: *See—*
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Litt, Donald D.; and Jaroff, David B., to Miner Industries, Inc. Balloon and valve assemblies and supply thereof for dispensing machine. 3,616,569, Cl. 46-90.
Little, Donald M., to Phillips Petroleum Company. Process for the manufacture of high purity N- paraffins. 3,617,499, Cl. 208-85.
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Ljungkull, Gunnar R., to Minnesota Mining and Manufacturing Company. Variable indication control signal. 3,618,014, Cl. 340-112.
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Nippon Electric Company, Limited: *See—*
Ogihara, Takashi, 3,617,636.
Shinoda, Daizaburo; Ishikawa, Masaoki; Muta, Hiroki; Asanbe, Shizuo; and Kawamura, Nobuo, 3,617,824.
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Nippon Gakki Seizo Kabushiki Kaisha: *See—*
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Nippon Oceanics Institute, Ltd.: *See—*
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Nippon Selfoc Company, Limited: *See—*
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Nippon Sheet Glass Co., Ltd.: *See—*
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Nippondense Kabushiki Kaisha: *See—*
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Nishide, Shinko: *See—*
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Nissan Motor Company, Limited: *See—*
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Nisson Chemical Industries Co., Ltd.: *See—*
Ishida, Seiichi; Kamuro, Yasuo; Takano, Tadayoshi; and Iwata, Takashi, 3,617,245.

Nitrochemic G.m.b.H.: *See—*
Meyr, Rudolf; Haussermann, Eberhard; and Semmler, Peter, 3,616,759.

Noe, Robert Joseph: *See—*
Verhille, Karel Eugeen; Noe, Robert Joseph; Voet, Luciaan Frans; and De Poorter, Henri,3,617,269.

Noli Aktiengesellschaft: *See—*
Hoeher, Kurt Albert, 3,617,035.

Nome, Harald,; and Zickfeld, Herman E., to M.Z.M. Corporation. Multiple pushbutton switch with improved actuating means. 3,617,661, Cl. 200-5.

Nomura, Hisayuki: *See—*
Katayama, Yasukazu; Okamoto, Katsuyoshi; Nomura, Hisayuki; and Kurohara, Akikazu,3,617,610.

Noponen, Harold W.: *See—*
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Nordlund, Richard T.: *See—*
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Nordquist, Walter R.; and Toy, Wing N., to Bell Telephone Laboratories, Incorporated. Time division switching system employing common transmission highways. 3,617,643, Cl. 179-15.

Nordquist, Walter R.; and Toy, Wing N., to Bell Telephone Laboratories, Incorporated. Transistor shift register using bidirectional gates connected between register stages. 3,618,033, Cl. 340-172.5

Normand, William E. Wild oat sprayer attachment. 3,616,769, Cl. 111-6.

Norris Industries, Inc.: *See—*
Willms, Charles F., 3,616,860.

Norsk Hydro-Elektrisk Kvaelstofaktieselskab: *See—*
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North American Rockwell Corporation: *See—*
Booher, Robert Kenneth, 3,617,767.
Brand, Zay C., 3,616,699.
Domshy, Ernest H., 3,617,850.
Heap, Richard T.; and Widmont, Joseph C., 3,616,533.
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Northern Electric Company Limited: *See—*
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Cormack, George D.; and Manning, Ronald P., 3,617,880.

Northern Natural Gas Company: *See—*
Klass, Donald L.; and Landahl, Carl D., 3,616,607.

Norton, David E.; and Lake, Joseph A., Jr., to International Business Machines Corporation. Sensing circuit having regenerative latching circuits responsive to threshold differences in biasing voltages derived from a pair of differentially variable currents. 3,617,770, Cl. 307-235.

Noryb Manufacturing, Inc.: *See—*
Daggett, Byron G., 3,616,711.

Notari, Georges, to Ugine-Carbone. Roll for rolling mills. 3,616,671, Cl. 72-237.

Nusbickel, Edward M., Jr., to Bethlehem Steel Corporation. Ultrasonic inspection carriage. 3,616,684, Cl. 73-71.5

Nusca, Michael J.: *See—*
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N.V. Hollandse Signaalapparaten: *See—*
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N.V. Nederlandse Raffinaderij van Petroleumproducten: *See—*
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Nylonge Corporation: *See—*
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Oatfield, John C.: *See—*
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Obergfell, Oskar; and Hummel, Gunter, to Kundo-Kieninger & Obergfell. Digital clock. 3,616,642, Cl. 58-125.

Oberhart, George S., to Cred-X Corporation, mesne. Verification system. 3,617,706, Cl. 235-61.7

O'Connell, John J.:*See—*
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Odaka, Toshihiko: *See—*
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Oder, Edward G., Jr., to Warren Petroleum Corporation. Excitation of alternating current machinery. 3,617,858, Cl. 322-76.

Oettinger, Willi; Saum, Walter; and Seubert, Rolf, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Process for hydrocracking heavy hydrocarbons. 3,617,507, Cl. 208-111.

Offutt, William C.; Goldthwait, Richard G.; Murphy, James R.; and Stauffer, Harry C., to Gulf Research & Development Company. Process for producing lubricating oils with good low temperature hazing properties. 3,617,475, Cl. 208-33.

Ogihara, Takashi, to Nippon Electric Company, Limited. Pitch detection apparatus. 3,617,636, Cl. 179-1.

Ogilve Flour Mills Company, Limited, The: *See—*
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Ohara, Yasutaro: *See—*
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Ohaus Scale Corporation: *See—*
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Ohi, Reiichi; Amano, Hiroyuki; Iwano, Haruhiko; and Shirasu, Kazuo, to Fuji Photo Film Co., Ltd. Simultaneous bleach-fixing method in color photography. 3,617,283, Cl. 96-60.

Ohio State University Research Foundation, The: *See—*
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Ohio State University, The: *See—*
Golis, Matthew J.; Mc Master, Robert C.; and Cooper, Gary L., 3,616,682.

Ohkubo, Kinji; and Masuda, Tadao, to Fuji Shashin Film Kabushiki Kaisha. Stabilization process for thermally developable light-sensitive elements. 3,617,289, Cl. 96-95.

Ohlmann, Robert C.: *See—*
Mazelsky, Robert; and Ohlmann, Robert C.,3,617,937.

Ohlschlager, Hans; Riester, Oskar; Kampfer, Helmut; Lohmer, Karl; and Kuffner, Karl, to Agfa-Gevaert Aktiengesellschaft. Optically sensitized light-sensitive silver halide material. 3,617,296, Cl. 96-140.

Ohmae, Nobuo: *See—*
Tomiita, Kazuo; Takase, Takeshi; Fukuhara, Mototada; Sano, Chikara; and Ohmae, Nobuo,3,616,634.

Ohno, Junji, to Nippon Gakki Seizo Kabushiki Kaisha. Magnetic field reponsive key switch device for producing attack effect in electronic musical instruments. 3,617,600, Cl. 84-1.1

Ohteru, Sadamu: *See—*
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Okabe, Takahiro: *See—*
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Okada, Toshio: *See—*
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Okamoto, Katsuyoshi: *See—*
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O. K. Partnership: *See—*
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Oku, Kyoichi: *See—*
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Okubo, Kei; Horiguchi, Toru; Nakai, Miyoji; and Shimada, Haruhisa, to Matsushita Electric Industrial Co., Ltd. Apparatus for compression moulding powder material within containers. 3,616,493, Cl. 18-20.

Okumoto, Masanori: *See—*
Fukui, Saburo; Yamazaki, Tsunehiro; Yamamoto, Masato; Miyake, Masuichi; and Okumoto, Masanori,3,617,039.

Oldenburg, Jerk Gunnar, to Kockums Mekaniska Verkstads AB. Combustion regulator. 3,616,997, Cl. 236-14.

Oleksiak, Robert E., to Sperry Rand Corporation. Non-volatile read-write memory with addressing. 3,618,051, Cl. 340-173.

Olenzak, Albert T.: *See—*
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Ollerich, August W., Jr.: *See—*
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O'Loughlin, Francis A., to Thomas & Betts Corporation. Dual-wire connector. 3,617,616, Cl. 174-94.

Olson, Arthur R., to Kendall Company, The. Process for forming a bonded nonwoven fabric. 3,617,417, Cl. 156-181.

Olson, Arvid A.: *See—*
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Olympus Optical Co., Ltd.: *See—*
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Ono, Masao: *See—*
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Ono, Tadashi: *See—*
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Ooka, Hiroshi, to Castle & Cooke, Inc. Nut and fruit harvesting system. 3,616,629, Cl. 56-329.

Opocensky, Willard J.: *See—*
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Oppegaard, Mogens, to Asbjorn Oppegaard. Electrical resistance bridge with a heat sensitive resistor for the measurement of the thermal dispersion within the ambience of the resistor. 3,616,677, Cl. 73-27.

Opti-Cap Inc.: *See—*
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Optical Coating Laboratory, Inc.: *See—*
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Optical Scanning Corporation: *See—*
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Orime, Nobutake: *See—*
Nakahara, Shojiro; and Orime, Nobutake,3,617,945.

Orlando, Daniel, to Globe-Union, Inc. Level detector device for adding conductive liquid to a container. 3,616,824, Cl. 141-198.

Osaki, Bonji: *See—*
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Oshima, Katsutoshi; Kajiyama, Jiro; Fukumoto, Shin; and Nagao, Nobuo, said, Oshima, said Kajiryama, said Fukumoto, and Nagao, Aiko, legal representatives of Nagao, Nobuo, dec'd. assors. to Osman Kogyo Kabushiki Kaisha. Method and material for separating oil from oil- containing water. 3,617,566, Cl. 210-40.

Osika, Thomas F., to McGill Manufacturing Company, Inc. Electrical switch having insulated cover for the switch terminals. 3,617,674, Cl. 200-166.

Osterloh, Fritz: *See—*
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Osterreichishe Stickstoffwerke Aktiengesellschaft: *See—*
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Othmer, Donald F. Refrigeration in cycles of freezing and melting. 3,616,653, Cl. 62-58.

Othmer, Donald F. System for electrically heating a fluid being transported in a pipe. 3,617,699, Cl. 219-300.

Otis Engineering Corporation: *See—*
Cummings, Leslie L., 3,617,152.

Ott, Charles D., to American District Telegraph Company. Vault protection system. 3,618,062, Cl. 340-261.

Ott, Rudi: *See—*
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Ottensener Eisenwerk GmbH: *See—*
Koch, Ulrich, 3,616,985.

Otto, Wolfgang K. F., to Deering Milliken Research Corporation. Linear polyester fiber shrinkage with HNO_3 or formic acid in a halogenated hydrocarbon and the products so shrunk. 3,616,504, Cl. 28-72.16

Ottolenghi, Aldo. Method of drying lumber. 3,616,544, Cl. 34-9.5

Overhead Door Corporation: *See—*
Harris, Donald S., 3,616,575.

Owen, Brian: *See—*
Barnes, Clare Earl; and Owen, Brian,3,617,950.

Owen, Brian, to Bell Telephone Laboratories, Incorporated. Junction circulator wherein a conductive core extends within gyromagnetic material. 3,617,946, Cl. 333-1.1

Owens-Illinois, Inc.: *See—*
Heffran, Vernon C., 3,616,955.
Johnson, William E.; and Schmersal, Larry J., 3,618,071.
Mueller, Martin; and Zurhoefer, Bernard, 3,616,967.
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Paal, Hans: *See—*
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Pachurka, Sylvestre, to Societe dite S.A. Materiels Industries. Apparatus for the continuous checking of overhead contact lines feeding electrically driven Railroad vehicles. 3,616,683, Cl. 73-71.5

Pacific Vegetable Oil Corporation: *See—*
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Paderborn, Weinreich: *See—*
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Paderwerk Gebr. Benteler: *See—*
Bick, Klaus; Paderborn, Weinreich; Wolfgang, Wilhelmsboehe; and Harmse, Lothar, 3,616,844.

Padilla, John Arthur, to Cleveland Bridge and Engineering Company, Limited, The. Fritction welder. 3,616,980, Cl. 228-2.

Page, Charles E.; and Andersen, Gustavo A., to Hazeltine Corporation. Light collection and detection apparatus comprising plural light sensors so spaced that the composite response is independent of source position. 3,617,752, Cl. 250-209.

Pagel, Armin B., to Eastman Kodak Company. Method and apparatus for automatically focusing film projectors. 3,617,119, Cl. 352-140.

Palmer, Ronald F.: *See—*
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Pan American Petroleum Corporation: *See—*
Egan, Jimmy D.; Woodall, Hommer H., Jr.; and Kunkel, Lorenz V., 3,617,221.
Raza, Syed H., 3,616,858.

Pan, Pei Tai, to Fairbanks Morse Inc. Biogrid unit and method. 3,617,541, Cl. 210-17.

Paoli, Thomas L.; and Ripper, Jose E., to Bell Telephone Laboratories, Incorporated. Method for pulse-width modulating semiconductor lasers. 3,617,932, Cl. 331-94.5

Pappe, Gunter: *See—*
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Paracurd S.A.: *See—*
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Paradysz, Robert E.; and Smith, Warren L., to Bell Telephone Laboratories, Incorporated. Beat frequency generator using two oscillators controlled by a multi-resonator crystal. 3,617,923, Cl. 331-43.

Paris, Hugh P. Concrete batchor plant and double-end loading transit mixer. 3,617,031, Cl. 259-165.
Park-Ohio Products, Inc.: *See—*
Collins, Richard J.; and Laughlin, John R., 3,616,807.
Parker, Bernhard Dollman, to Decca Limited. Data transmission systems. 3,618,020, Cl. 340-147.
Parker, Daniel G.: *See—*
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Parker, David E.; and Beaudoin, Thomas L., to United States of America, Navy. Internal coil magnetostrictive transducer. 3,617,999, Cl. 340-11.
Parker, Theodore, to Marathon Oil Company. System for combining a plurality of pulses into a single pulse train. 3,618,023, Cl. 340-150.
Parkinson, Alexander: *See—*
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Parry, Margaret G.: *See—*
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Parry, Robert D., deceased0 (by Parry, Margaret G.; executrix), to O. K. Partnership. Card storage transfer and positioning device for use in conjunction with card retrieval apparatus. 3,616,902, Cl. 209-80.5
Parsazad, Komad. Terrain profile recorder. 3,618,115, Cl. 346-7.
Pascal, Yves Andre: *See—*
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Pascual, Carlos Manuel: *See—*
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Patchett, Philip L., to Bendix Corporation, The. Roll clutch starter drive with shock absorber. 3,616,700, Cl. 74-7.
Patel, Chandra K. N.; and Van-Tran, Nguyen, to Bell Telephone Laboratories, Incorporated. Far infrared wave generator or mixer. 3,617,764, Cl. 307-88.3
Patton, George Allen, to AMP Incorporated. Electrical junction means. 3,617,612, Cl. 174-59.
Patton, George Allen, to AMP Incorporated. Terminal junction interconnection system. 3,617,983, Cl. 339-98.
Patton, Lawrence Alfred. Container stuffing sleeve. 3,616,957, Cl. 220-1.5
Paucksch, Heinrich: *See—*
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Paulson, John Rene, to Sesame Industries Limited. Tape applicator. 3,617,422, Cl. 156-552.
Pauwels, Maurice P., to Bendix Corporation, The. Caliper housing retaining spring key. 3,616,879, Cl. 188-73.6
Pavljuk, Paul: *See—*
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Pearson, William S., to Cypro Incorporated. Comminuting method of and means for conditioning thermoplastic molding material. 3,617,005, Cl. 241-18.
Peck, Harry T.; and Schneider, Harold W., to Gifford-Hill Pipe Company. Means for forming gasket grooves in concrete pipe spigots. 3,616,500, Cl. 25-39.
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Peilstocker, Gunter, to Farbenfabriken Bayer Aktiengesellschaft. Mouldings of polycarbonates with improved surfaces and process for their production. 3,617,330, Cl. 117-33.3
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Perna, Vincent F., Jr., to Phase Industries Incorporated. Miniature feed-through wide band bypass capacitor assembly. 3,617,830, Cl. 317-242.
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Petersen, Jorgen Hartvig: *See—*
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Mange, Franklin E.; Buriks, Rudolf S.; and Fauke, Allen R., 3,617,571.
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Hays, George E.; and Albright, Melvin A., 3,616,602.
Little, Donald M., 3,617,499.
Montgomery, Dean P., 3,617,494.
Phipps, Robert E., to Sweetheart Plastics, Inc. Sealed container or cup. 3,616,962, Cl. 220-60.
Phoenix, Lancelot, to Lucas, Joseph, (Industries) Limited. Battery charging system with a permanent magnet alternator and means for minimising noise. 3,617,852, Cl. 320-61.
Piasecki, Raymond F.; and Kuo, Lai Che, to Thomas & Betts Corporation. Die set. 3,616,674, Cl. 72-412.
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Hurlimann, Reinhard; and Opocensky, Willard J., 3,618,056.

Singer, Karl; and Vogel, Lewis P., said Vogel assor. to said Singer. Changeable message outdoor advertising sign. 3,616,554, Cl. 40-31.

Sinizer, David I.; Toy, Albert; Atteridge, David G.; and Fanelli, Louis H., to North American Rockwell Corporation. Stress-oriented filament winding in composite panels. 3,616,822, Cl. 140-92.2

Sinnott, Kenneth M., to Grace, W. R., & Co. Polyamide epoxy resin-reaction product adhesive. 3,616,963, Cl. 220-81.

Sirvet, Enn; Whelan, Edward J.; and Skrypek, John P., to Sun Chemical Corporation. Overvarnish assembly for continuous can printing machines. 3,616,778, Cl. 118-262.

Sjotun, Kyrre Guttorm, to Danfoss A/S. Oil burner system with motor driven pump controlling by-pass valve. 3,617,154, Cl. 417-299.

Skauli, Oyvind: *See—*
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Skilkum, John D.: *See—*
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Skillicorn, Brian, to High Voltage Engineering Corporation. Modular electron source for uniformily irradiating the surface of a product. 3,617,740, Cl. 250-49.5

Skinner, Davis A., to Union Oil Company of California. Internal combustion engine fuel system minimizing evaporative fuel losses. 3,617,034, Cl. 261-22.

Skinner, M. B., Company: *See—*
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Skolnick, Michael L., to United Aircraft Corporation. Interferometric optical isolator. 3,617,129, Cl. 356-106.

Skrypek, John P.: *See—*
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Skutta, Frank R.: *See—*
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Sliwoski, Robert H., to Emerson Electric Co. Food heating apparatus. 3,616,746, Cl. 99-234.

Sloan, Clarence R. Combination fishing pole holder and signalling device. 3,618,068, Cl. 340-283.

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Smit, Jacobus J., to N.V. Nederlandse Raffinaderij van Petroleumproducten. Refining of hydrocarbon with boron trifluoride. 3,617,533, Cl. 208-292.

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Smith, Bernard, to United States of America, Army. Glass laser window sealant technique. 3,616,523, Cl. 29-472.7

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Smith, Edward W. Filtering and concentrating means and method. 3,617,543, Cl. 210-19.

Smith, Frank Edward; and Cross, Frederick Reginald, to Her Majesty Queen of Canada. Anti-clutter radar receiver. 3,618,087, Cl. 343-7.7

Smith, Frank W.: *See—*
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Smith, George H.: *See—*
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Smith, Lawrence R., to Motorola, Inc. Optimizing control systems. 3,617,717, Cl. 235-151.1

Smith, Lawrence R., to Motorola, Inc. Control channel for an optimizing control system. 3,617,725, Cl. 235-183.

Smith, Leland B., to Beckman Instruments, Inc. Commutated buffer amplifier. 3,617,916, Cl. 330-30.

Smith, Lester E.; and Bender, Donald E., to Olin Corporation. Fluid actuated starter assembly. 3,616,785, Cl. 123-179.

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Smyth, Robert C., to Digital Apparatus Corporation. Apparatus for changing a digit of a stored number. 3,617,711, Cl. 235-92.

Snitzer, Elias; Hoffman, Frank W.; and Guertin, Normand A., to American Optical Corporation. Laser structure having a controllable frequency spectrum of stimulated emissive energy. 3,617,930, Cl. 331-94.5

Snook, Richard K.; and Burton, John C., to Diginetics Incorporated. Stenographic apparatus providing a photographically recorded digitally encoder record. 3,617,634, Cl. 178-15.

Snyder, Duane W., to Crompton-Shenaudoah Co. Soil release fabrics and method for producing same. 3,617,188, Cl. 8-115.5

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Soames, Michael Richard, to Metals Research Limited. Image analysis systems. 3,617,631, Cl. 178-6.8

Soares De Melo, Adelino Jose, to Termec-Equipamentos Termicos de Coimbra LDA. Apparatus for the storage and feeding of water to boilers. 3,616,609, Cl. 55-164.

Sobolewski, Edward J. Firearm trigger lock fitting on the trigger guard. 3,616,559, Cl. 42-1.

Sobottke, Mark D.; and Kruer, Clifford W., to National Cash Register Company, The. Automatic generation of microscopic patterns in multiplicity at final size. 3,617,125, Cl. 355-46.

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Societe Anonyme Belge d'Exploitstion de la Navigation aerienne (SABENA): *See—*
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Solt, Guenther: *See—*
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Southwick, Kenneth J., to Pyro-Magnetics Corporation. Apparatus for the destruction of refuse. 3,616,768, Cl. 110-8.
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Sugahara, Yujiro; Maeno, Masahiro; Eguchi, Shiro; and Kurosaki, Hideaki, to Mizusawa Kagaku Kogyo Kabushiki Kaisha. Dry acid treatment process of alumina-silica type clay. 3,617,215, Cl. 23-182.
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Kjos, Magne Jarle: *See*—
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LaVallee, Theodore R., to Eaton Yale & Towne, Inc. Method of operating a press over a 4 to 1 range of stroking rates. Re. 27,219, 11–2–71, Cl. 310—95.

McMinn, Robert E., and C. C. Dougherty, Jr., to Black, Sivalls & Bryson, Inc. Method and apparatus for the treatment of liquids. Re. 27,210, 11–2–71, Cl. 55—170.

Melone, Robert R., to Illinois Tool Works Inc. Blue lateral and purity magnet assembly. Re. 27,209, 11–2–71, Cl. 335—212.

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CLASSIFICATION OF PATENTS

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